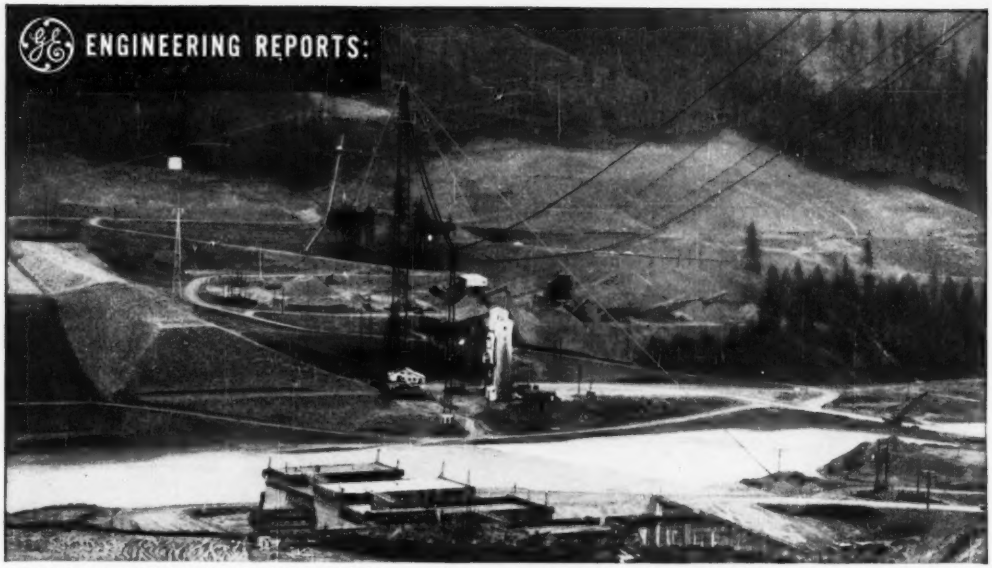
ENGINEERING NEWS-RECORD

★ TUNNELS CUT PLANT COST

★ FAKE QUAKE TESTS BUILDING

A McGRAW-HILL PUBLICATION



800,000 YARDS OF CONCRETE will be needed to complete Lookout Point Dam on the Willamette River near Lowell, Oregon. G-E powered cableway—2600 feet long with 25-ton hook capacity—is of radial type, with stationary 428-foot-high head tower and movable tail tower. Maximum conveying speed is 1800 fpm, maximum hoisting speed is 470 fpm.

Complete electrification keeps Lookout Point on schedule

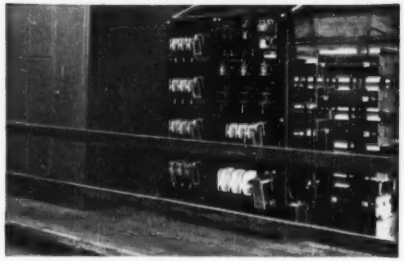
Morrison-Knudsen selects G-E drives to batch and place concrete at Oregon dam

To meet a tight work schedule at the Corps of Engineers' Lookout Point Dam, the Morrison-Knudsen Co. relies on modern construction equipment—electrified throughout by General Electric. This equipment, spearheaded by a Travelift cableway built by Construction Improvements Ltd., and Lidgerwood Industries Inc. is helping to place an average of 2000 yards of concrete per day.

Lookout Point, an earth-and-gravel-fill dam located at Lowell, Oregon, is a combined flood-control and power-generation project scheduled for 1953 completion. To heavy construction people, it provides one more example of the effective use of *electrified* equipment on jobs where smooth, dependable operation is an everyday "must."

Whether you buy or build construction equipment, you'll find it's safer, more flexible, and more efficient when electrified by G.E.—with skilled engineering help in application, installation, and service. Find out how this equipment and service can pay off for you by contacting your nearest G-E Apparatus Sales Office. General Electric Co., Schenectady 5, N. Y. 664-25

CABLEWAY is driven by this G-E 500-hp, 2300-volt wound-rotor motor. G-E drives also power conveyors, rock crushers, and batch-plant equipment.

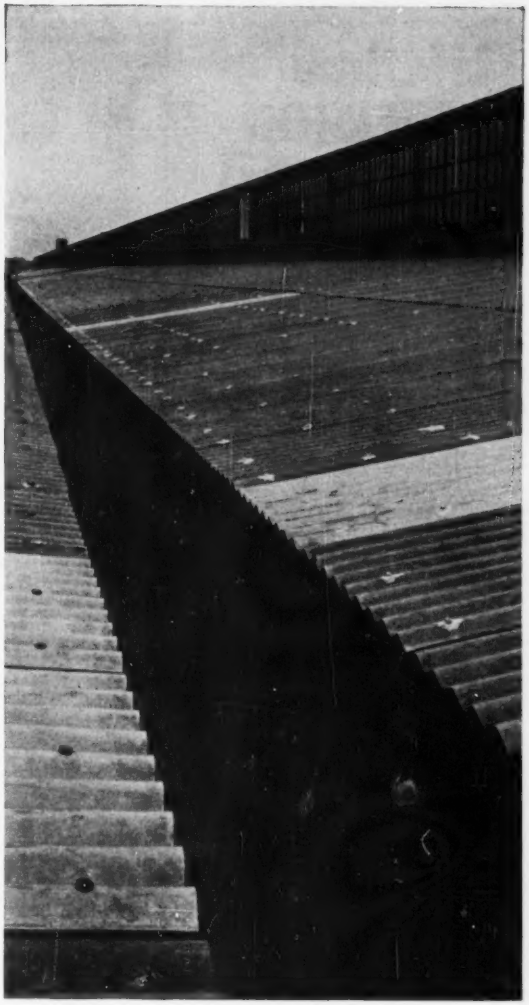


CENTRALIZED CONTROL equipment for cableway includes (left to right) Limitamp high-voltage primary panel, secondary control, and cast-grid resistors.

Engineered Electrical Systems for Heavy Construction

GENERAL ELECTRIC

Inside Gutters 1000 ft long *made of* $\frac{3}{16}$-*in.* Mayari R

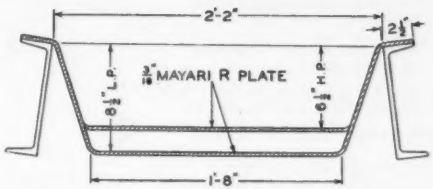


The original inside gutters on this warehouse building in Harrisburg, Pa., failed after seven years. They could not carry away the burden of cinders and debris that accumulated during extended dry spells. The periodic shoveling that was required to open the gutters damaged them, causing premature leakage.

The new gutters are made of 3/16-in. Mayari R. Each of them is located in a valley between the aisles, extending the full length of the building. Installed in sections that range from 50 ft to 70 ft in length, each gutter has electrically welded expansion joints at the high points. Varying depth of the sections provides a 2-in. drainage slope from high points to low points where the rainwater outlets are located.

Mayari R has certain advantages that led to its selection for this job. It is a low-alloy, high-strength steel with good resistance to impact and abrasion. It can withstand cinders washing along its surface, or any shoveling that may be necessary. Also, it has excellent resistance to atmospheric corrosion. Tests made in corrosive atmosphere show that Mayari R lasts 5 to 6 times as long as plain carbon steel; and 2 to 4 times as long as copper-bearing steel.

Write for Catalog 259. It covers in detail the properties of Mayari R and many recommended applications.



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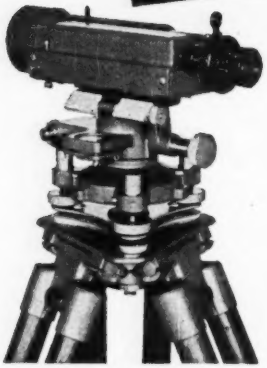

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ABP Member ABC

Volume 149 — December 25, 1952 — No. 26

WALDO G. BOWMAN
Editor

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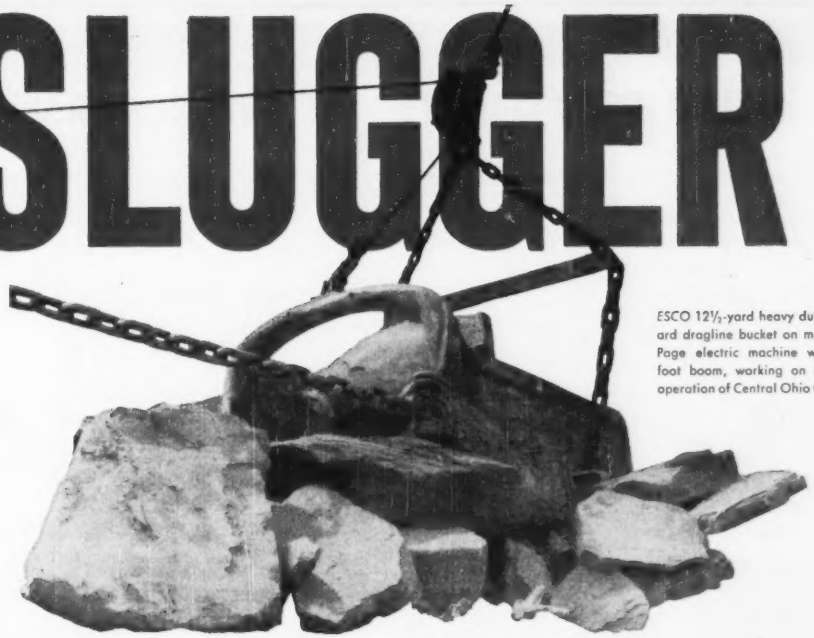
SLUGGER



ESCO 12½-yard heavy duty standard dragline bucket on model 627 Page electric machine with 165-foot boom, working on stripping operation of Central Ohio Coal Co.

on the mean, tough jobs

*J*ob cost records that show a profit, and completion dates that run ahead of schedule — that's what *ESCO* dragline buckets mean to contractors throughout the world. For when it comes to slugging it out on tough going, here's what they do—

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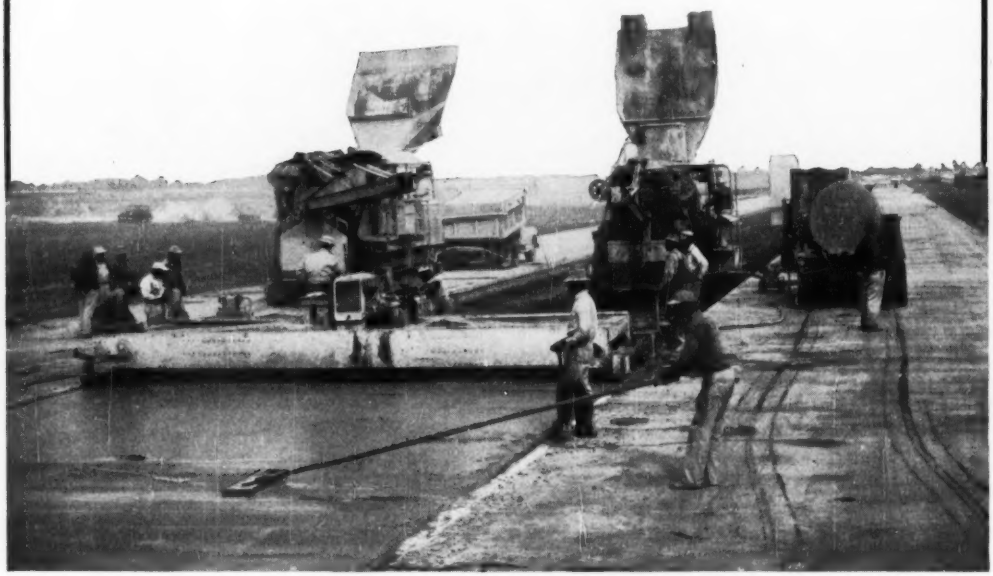

W. L. Cobb Construction Co. of Decatur, Ga., and Tampa, Fla., recently completed, ahead of schedule, the widening and lengthening of runways at the Pine Castle Air Force Base, Orlando, Fla. The project involved approximately 1,250,000 cubic yards of excavation, 230,000 tons of lime rock, 56,000 cubic yards of concrete, 98,200 tons of asphalt, and 40,000 feet of pipe.

JUST about No. 1 requirement for a smooth-running job is smooth-running equipment. That's why so many leading contractors, like W. L. Cobb Construction Co. for example, prefer the petroleum products identified by the familiar Orange Disc.

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Gulf lubricants and fuels work as a team to help contractors get more hauls, fewer overhauls, and bigger profits!

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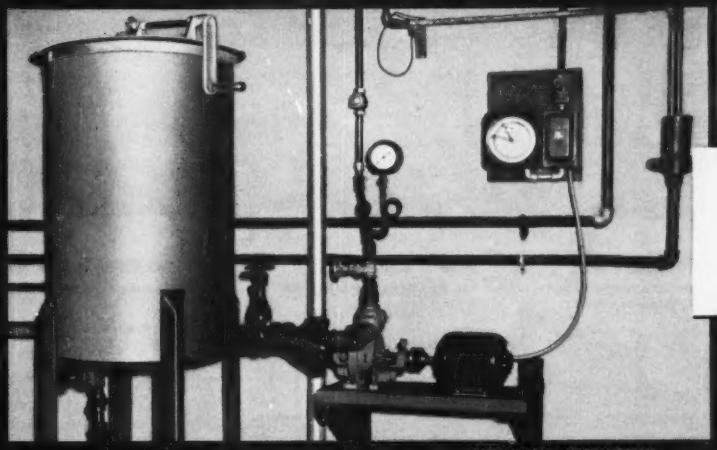

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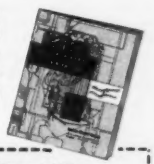

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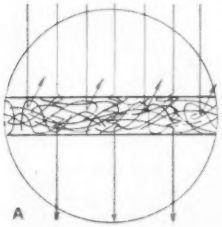
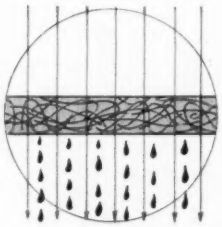


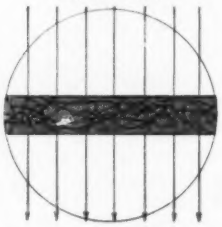
Diagrammatic enlargement of cross section of paper with high strength but low transparency. Fibers are surrounded by air, which has different index of refraction. Many light rays are bent back and do not get through.

SAME PAPER
TRANSPARENTIZED WITH FLUID MATERIAL



Same paper as "A", filled with oil or other fluid material, giving spaces between fibers same index of refraction as fibers. Reflection and refraction of light are reduced and paper becomes highly transparent. But transparency is not permanent because *fluids* "bleed" out.†

SAME PAPER
TRANSPARENTIZED THE ALBANENE WAY



Same paper as "A", filled with an inert synthetic resin, with correct index of refraction. This is how Albanene is made. Its transparentizer does not "bleed" out. Albanene holds its color and strength and is permanently transparent.†

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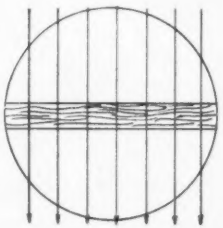

Papers are also transparentized at the mill by a "beating" process. The fibers are crushed, flattened and compacted. Reflection and refraction of light are reduced. But the process weakens the fibers and the strength of the transparent paper is low.

More than 15 tests are made during production of Albanene. For example, each production roll is tested for pencil "take", for pencil erasing and the taking of drawing ink. To eliminate human variables, pencil lines are drawn by machine. In this way you are assured of the uniformity of working surface so much desired by draftsmen, and assured of a paper that makes cleaner, sharper prints . . . now or a generation later. Ask your K&E Distributor or Branch for further information.

† Prove this by making the "drafting tape test" Press a short piece of drafting tape on fluid-transparentized paper, and another on Albanene. Strip them off the next day and examine both papers. Notice that enough fluid has drifted out of the ordinary paper into the tape to destroy much of the transparency. And notice that Albanene is not affected. What drafting tape does over night, time will do naturally.

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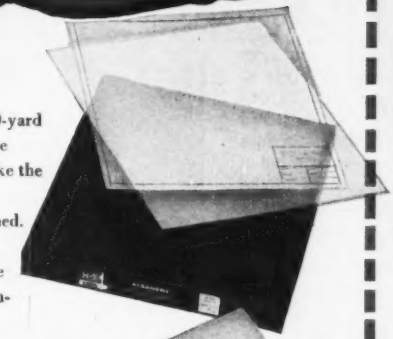
The Right Angle



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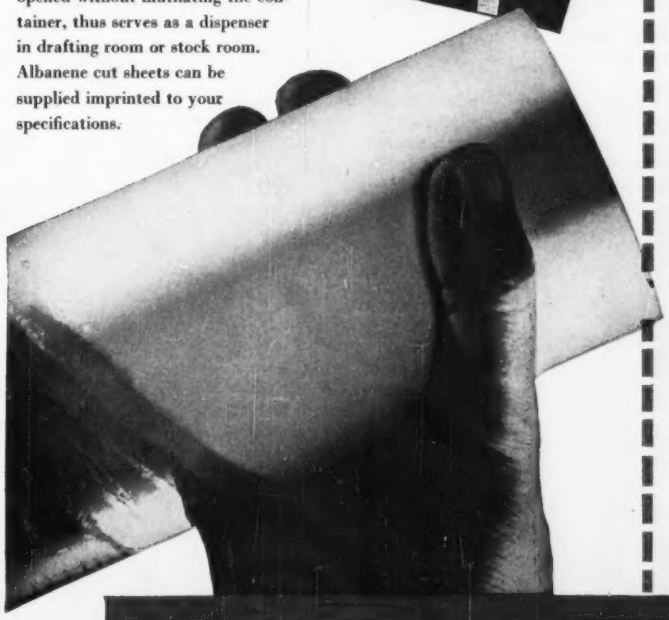
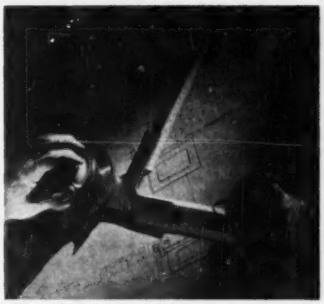
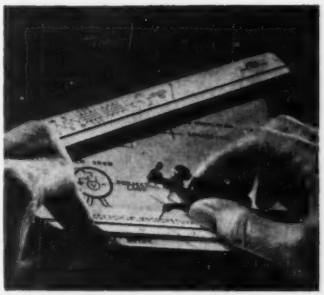




Once you've discovered the pleasure of drawing on Albanene, the next logical step is to save time, trouble and eyesight with a K&E PARAGON® Drafting Machine. You control your calibrated straight edge with a light touch of one hand, for parallel lines and lines at any angle.



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...A Tall Order

"Two years ago I was called in by a large company which had purchased 40 acres of farm land as a site for buildings worth $5,000,000," recalls Stanley M. Shartle, Registered Land Surveyor of Danville, Indiana. "Besides a certified land boundary, they required a topographic map showing elevations to the nearest 0.1 ft. at the approximate corners of 50-ft. grid squares covering the entire area.—*And they wanted it done yesterday.*"

"The terrain was flat and timberless. It looked easy. But, at the site, I found corn standing more than 8 ft. tall everywhere and visibility nil. My orders were to 'cut not one stalk'; so I searched for a vantage point. All I found was more corn.

"Surprisingly, the north and south rows of corn proved to be almost in true meridian; and east and west rows were practically perpendicular. This made the location of the grid corners easy to establish without a transit.

"But for leveling I was desperate, 'til an idea hit me: remove the sliding legs from the extension tripod and replace them with 10-ft. lengths of 1-inch thinwall conduit which fit snugly into position. This giant tripod put the level's telescope 12 feet above the ground. On a 12-ft. ladder, I was able to see over the corn easily. It wasn't yesterday when I finished, but pretty darn close."

Corn "high as an elephant's eye" *created leveling problem for Stan Shartle. Solution: extend tripod legs with conduit.*

Remedy for "Frozen" Tripods

Did you ever have an instrument "freeze" to the tripod out in the field? Chances are that nothing you tried would budge it.

The next time it happens, take a tip from a cadastral engineer: spread the tripod legs apart until the instrument is a foot above the ground. The instrument will then come off easily. This engineer first tried the trick 40 years ago; says it's never failed since in any temperature or climate.

Gurley Transit on border survey: *This prominent cadastral engineer—who suggests the above method for "unfreezing" a tripod—used his Gurley Solar Transit in resurveying the Colorado-New Mexico boundary.*

Write for Bulletin 50 giving complete details on Gurley transits, levels and other engineering instruments. And enclose a surveying tip for this page.

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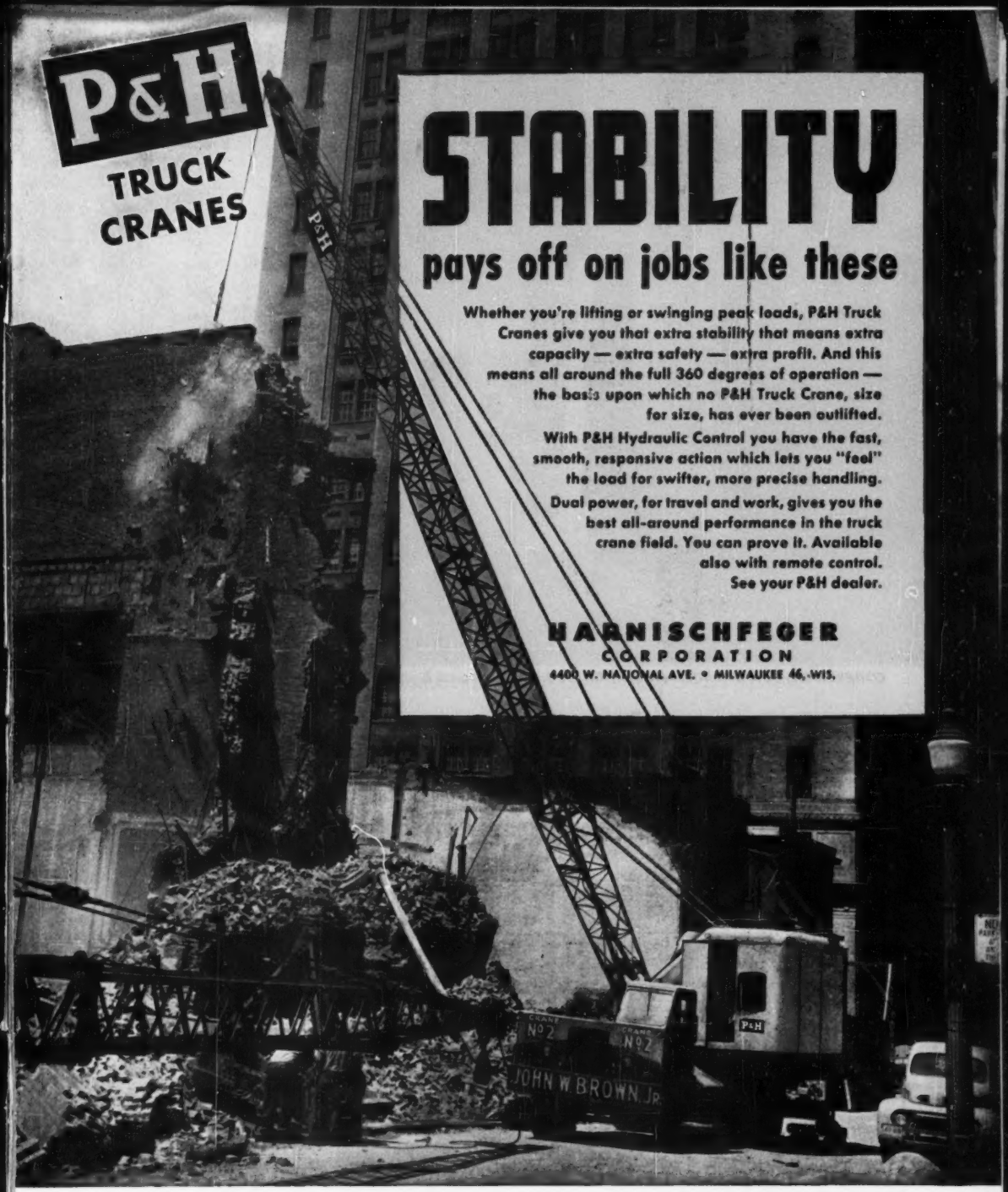
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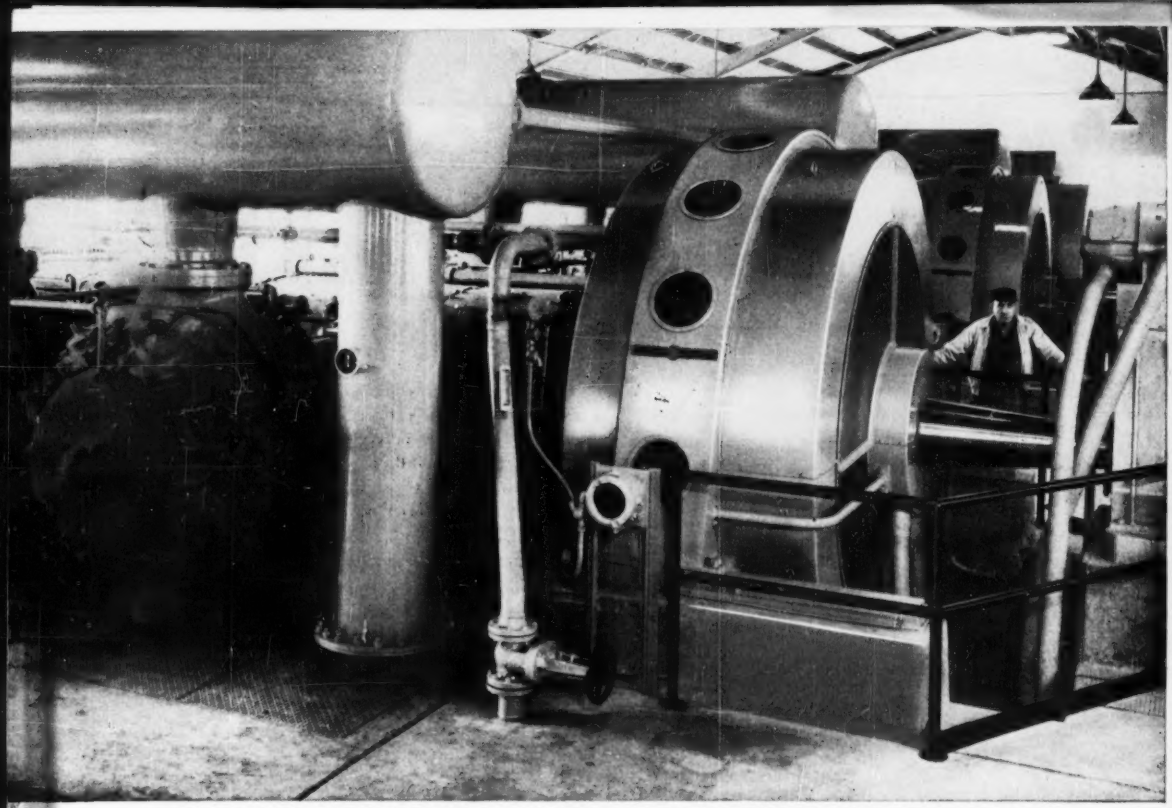
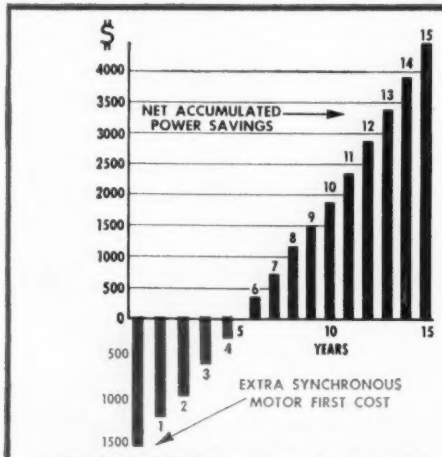


COMPRESSORS IN A GAS STORAGE STATION are driven by General Electric 3000 hp, 300 rpm synchronous motors.

Can synchronous motors cut

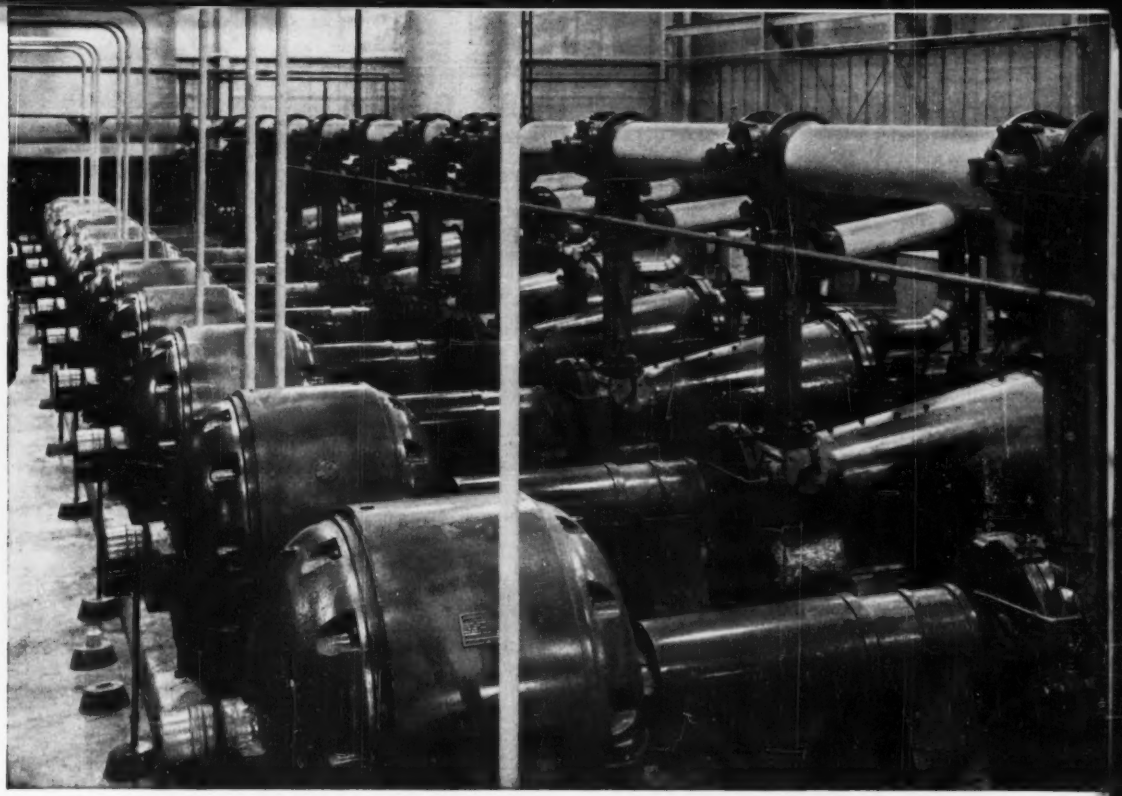


OPERATING SAVINGS on the synchronous motor application described above are shown over a period of twenty years. Extra first cost will be amortized in five years; savings will continue for many more.

Here's how one plant saves with a G-E Synchronous Motor

The specifications for a new pump motor were 250 hp, 600 rpm, 2300 volts, 3 phase, 60 cycle. The price of a 1.0 Power Factor synchronous motor, including exciter and control, was higher than an equivalent squirrel-cage induction motor with control. However, the synchronous motor efficiency, including exciter loss, was 1.6% higher than the induction motor (93.0% vs 91.4%). Since the motor was to operate continuously at a power cost of 11 mils per kilowatt-hour, it was found that the power savings would repay the additional investment in only five years. The operating savings will continue throughout the life of the motor—10, 20, even 30 years.

Savings such as these make synchronous motors the most economical drive for many heavy-duty, continuous-service applications. And in many cases, synchronous motors are lowest in first cost, too.



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Greater Efficiency on Large, Constant-Speed Applications Can Lower Power Costs Substantially

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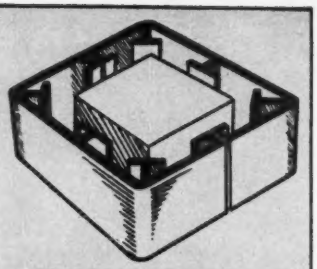
Furthermore, synchronous motors may be able to improve plant power factor—the ratio of total kilowatt load to total kva load. When these two fall out of balance, high system losses, high power bills, or increased maintenance costs commonly result. Using a ***unity power factor*** synchronous motor adds only to total kw load. And, a ***leading power factor*** synchronous motor will actually supply reactive kva's to your system, while operating at its normal rated output.

Before you select a drive for a large piece of equipment providing heavy and continuous service, be sure to investigate the economics of General Electric synchronous motors. Call in your G-E representative—he'll be glad to discuss your situation with you. Also, information on G-E synchronous motors and their application is available in the following bulletins: GEA-5332, "Low-Speed Synchronous Motors;" GEA-5426, "High-Speed Synchronous Motors;" GEA-5817, "Plant Power Factor Improved With G-E Synchronous Motors." Write to Section 770-27, General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC



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READER COMMENT

French canal lining

Sir: In the excellent article "Vacuum concrete revetment used to line French canal" (ENR Sept. 25, p. 53), attention should be called to an omission and an error. Entreprise des Grands Travaux Hydrauliques of Paris was the firm responsible for the work. The article gave the width of the elements of the articulated slabs as 3 ft, whereas they are in fact 1 ft.

I. Leviant
Managing Director
Vacuum Concrete
Paris

Moroccan airbase reporting

Sir: The Oct. 9 issue of ENR has just caught up with us after having been forwarded from Morocco. Although my husband is the engineer and subscriber, I am always an interested lay reader of your publication.

The issue mentioned was of special importance to me since it contained your reaction to the House Appropriations Committee report on the Moroccan airbase construction. I felt that I must write to congratulate and thank you for your exceptionally fair and lucid reporting of the situation and for your Oct. 9 editorial. Since the controversy arose last spring, ENR has given it an unbiased coverage which ignored sensationalism and sought to present facts rather than hastily arrived-at conclusions. It is only regrettable that the House report did not receive the same nationwide publicity in other newspapers and magazines as did the Senate investigations.

Because I worked on the Morocco project from its inception until the end of last April, I was especially disturbed by the exaggerated and distorted reports which reached the American public and by the treatment of the officers directly responsible.

Clair N. Morgenthaler
(Mrs. Walter N.)
Woodbridge, N. J.

Reason for delay

Sir: In your issue of Oct. 30, 1952, (p. 19) you state that "for unexplained reasons, the Air Force is keeping the security lid clamped tight on the fact that" it has a committee at work reviewing its installations program.

The Air Force has not attempted to "classify" the fact of the formation of the committee or the intended activities. However, while the committee was formed in August, the Air Force did not believe that it could publicize its operations properly until completion of the negotiations and execution of the contract with the joint venture of DeLeuw, Cather and Company and the J. E. Greiner Company, who will do the "spade" work for the committee. As soon as this contract was executed, the Air Force issued a publicity release on the subject, a copy of which is attached.

The Projects Installations Committee has been formed to effect a complete review of all phases of the Air Force construction program. Bearing in mind that the Air Force was increased from a 48-wing force to a 143-wing force in four increments during the space of less than a year and a half, it is obvious that tremendous installations problems would be posed by a correspondingly marked increase in the scope of a world-wide airfield and installations program. In the case of each increase in size of the Air Force, the preparation of a new installations program was required in the matter of a few weeks for presentation to Congress. Further, the problem is complicated by the fact that, basically, World War II bases are not adequate for the use of a jet-powered Air Force. Any corporate executive—any construction expert—knows what planning of this scope in such a brief period involves.

In full recognition of its problems, the Air Force is seeking the assistance of the architect-engineering and construction professions in the belief that the broad backgrounds and experience of those involved will provide facilities cheaper and quicker.

E. V. Huggins
Assistant Secretary
of the Air Force

Pipe-jacking limits

Sir: In your Nov. 13, 1952, issue, there is a description of the jacking of a 7-ft-diam steel pipe, $\frac{3}{4}$ in. wall thickness under 14 railroad tracks, where a jacking force of 600 tons limited the penetration of the pipe to 120 ft, the remaining 30 ft of crossing then had to be done in open cut. This is an unusual pipe jacking operation, in both the size and type of pipe. In a report on "Jacked-in-Place Pipe Drainage", as prepared by the writer

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READER COMMENT

for the Committee on Stress Distribution in Earth Masses of the Highway Research Board, published in its Bulletin No. 14, 1948, there were given some recommendations which are substantiated by the experience reported in this article.

The recommended jacking provisions were as follows:

A. Where excavation is carried ahead of the pipe, 125 psf of pipe surface.
B. Where excavation is carried to the pipe end during jacking, 300-350 psf.
C. Where jacking is progressed ahead of the excavation, 600 psf of pipe surface imbedded.

In this case, the maximum penetration of an 84-in. pipe under 600 tons pressure was 120 ft. The excavation was carried into the heading, but apparently not to the cutting edge. The resistance per square foot of imbedded surface was 450 psf which seems consistent with expectations.

In the above mentioned report, H. F. Peckworth added a chart showing pressure required to jack 144 ft. of 72-in. reinforced concrete pipe, with an outside perimeter substantially the same as the 7-ft-diam steel shell, and the pressure required at 120-ft imbedment was 670 tons. Total jacks available were 800 tons, just enough to complete the 144 ft push.

As to the strength of pipe to avoid undue distortion, the report recommended 400 d^3 per foot, or 19.5 kips per foot for a 7 ft pipe. There is not too much agreement on how to evaluate the strength of a steel shell under soil loading, except for empirical classifications of test loading methods taken together with some percentage of diameter deformations. Treating the pipe as a thin shell tube under uniform radial pressure, with an E value of 28,000,000, the maximum external pressure at crushing is 4,330 psf. Over the diameter of the pipe, the vertical projection of this pressure is 23.7 kips per foot, which would indicate that the ⅜ in. pipe is sufficiently strong against crushing but only if the external loads are uniform around the entire perimeter. Theoretically, a ¼-in. pipe is 75% stronger than the ⅜-in. and might have sufficient strength. Practically, no flexible pipe of this size can be installed without interior bracing to take care of unbalanced exterior forces.

Jacking pipe under railroad tracks is fairly customary, since the operating personnel of the system impose such time schedules that no other procedure is possible. When it comes to a highway, even the one "with its

tremendous commuter traffic in and out of Boston," the inconvenience of the user is seldom considered and as happened in this project, the pavement is cut open and somehow or other, traffic continues. The 90-ft gap could have been jacked—with the same equipment and using the railroad pipe section as a resistance to the jacking, and the same jacking pit.

The Engineering-News Record should take a bow for a well written report of this varied and noteworthy performance by the Merritt-Chapman & Scott Co.

JACOB FELD
New York, N. Y.

CALENDAR

Highway Research Board, annual meeting, National Research Council Bldg., Washington, D. C., Jan. 13-16.

American Society of Photogrammetry, annual meeting, Shoreham Hotel, Washington, D. C., Jan. 14-16.

National Association of Home Builders, Conrad Hilton Hotel, Chicago, Ill., Jan. 18-22.

American Society of Landscape Architects, annual meeting, Ansley Hotel, Atlanta, Ga., Jan. 26-28.

Association of Asphalt Paving Technologists, Rice Hotel, Houston, Tex., Jan. 26-28.

Associated Equipment Distributors, annual convention, Conrad Hilton Hotel, Chicago, Ill., Feb. 1-5.

Mason Contractors Association of America, Sherman Hotel, Chicago, Ill., Feb. 1-4.

California Street and Highway Conference, University of California, Berkeley, Feb. 4-6.

American Road Builders Association, Hotel Statler, Boston, Mass., Feb. 9-11.

American Concrete Institute, annual convention Statler Hotel, Boston, Mass., Feb. 17-19.

Interamerican Congress of Municipalities, Montevideo, Uruguay, Feb. 20-28.

Ohio Water Clinic, Ohio State University, Columbus, Feb. 19-20.

Illinois Conference on Highway Engineering, Urbana, Feb. 24-26.

Industry conference on air pollution abatement, Hotel Statler, Detroit, Mich., Feb. 26-27.

American Concrete Pipe Association, annual convention, Baker Hotel, Dallas, Tex., Feb. 26-28.

American Concrete Pressure Pipe Assn., annual convention, Baker Hotel, Dallas, Tex., Feb. 25.

American Concrete Agricultural Pipe Assn., annual convention, Baker Hotel, Dallas, Tex., Feb. 26.

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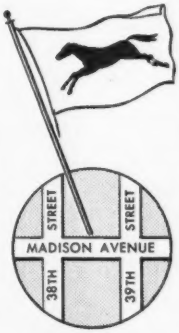

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Non-corporate debt—what's the limit?

Consumers and unincorporated business were in debt to the tune of about $121.4 billion at the end of 1951. This huge sum was two-thirds greater than the amount owed by these groups in 1929.

Back in the early Thirties, consumer debts—both on mortgages and other loans—were a heavy burden on the economy. Would they be a similar burden if the economy should run into trouble today? And have consumers and unincorporated business so exhausted their capacity to borrow that they will have to cut back on new borrowing—thus reducing demand for new houses, small commercial buildings, and consumer durable goods, all of which are heavily financed by borrowed money?

The answer seems to be partly "no" and partly "maybe." As far as mortgage debt is concerned, consumers and unincorporated business are carrying a vastly lighter load than they were 23 years ago. But the burden of consumer installment credit, on the other hand, has increased.

• **Mortgages**—Total mortgage debt owed by non-corporate borrowers was $69.5 billion at the end of 1951; it's probably about $10 billion higher today. Back in 1929, these debts added up to only $31.7 billion.

Nevertheless, the burden of mortgage debt today is less than it used to be. While these debts were rising 119%, income after taxes went up 172%. So total non-corporate mortgage debt—both residential and commercial—at the end of 1951 was only equal to 30.9% of current income, compared with 38.4% in 1929.

The big decline in interest rates since the Twenties has sharply reduced the strain of carrying mortgage debt. Interest rates on first mortgages used to run from 6% up, with second mortgages as high as 15%—sometimes more. But now mortgage money typically costs from 4% to 6%. Partly because of this decline, terms of repayment run only about 3% of current income now, compared with about twice as much 20 years ago.

Even in a recession, modern mortgage debts would not be so burdensome as those debts of 20 years back—especially with the government prepared to back up many of today's home mortgages. And mortgages are being written on much sounder terms than they used to be. Like long-term corporate bonds they are amortized—paid back in many small installments.

• **Consumer credit**—The situation on consumer credit—installment and other consumer loans—is somewhat different. Consumer credit currently represents a substantially larger claim on current income than it did in 1929.

Consumers owed $20,644 million on non-mortgage loans at the end of 1951, more than three times the amount they owed in 1929. Credit at the end of 1951 was 9.2% of 1951 income after taxes, compared with 7.6% in 1929. And installment credit has grown even faster than total consumer credit; it was 6% on income in 1951, compared with only 3.8% back in 1929.

Consumer credit has risen fast since last May, when U. S. credit controls were relaxed. In September, total consumer credit outstanding was $21.7 billion, up $2.3 billion over September, 1951. Installment credit was $15.2 billion, up $2 billion in one year.

No one knows just what the limits on consumer borrowing are—because the present level of credit is a record. It may be that there is plenty of room for more borrowing, or it may be that consumers are already carrying all the short-term loans they can stand.

But it is clear that the mortgage debt of consumers and unincorporated business is in much better shape than it was back in the Twenties. There is still plenty of leeway for more borrowing, and present-day mortgages are much sounder documents than the old style, single-payment variety. And the types of non-corporate debt not discussed above are generally regarded as being in good shape.

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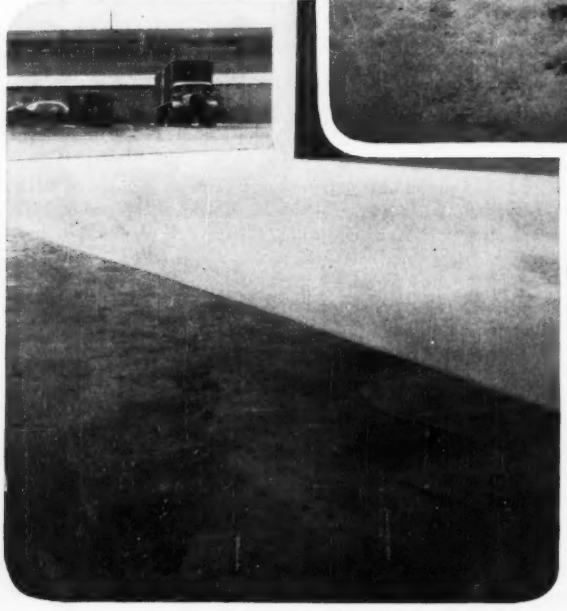

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THE CONSTRUCTION WEEK

• **Season's greetings**—It was the week before Christmas, but top command of the Corps of Engineers was hard put to find much cheer.

A week ago (ENR Dec. 18, p. 21) a congressional group criticized the Corps (though in a friendly fashion) for its slow paper work in civil functions fields. That criticism was followed fast by an announcement from Secretary of Army Pace that he had admonished retiring Chief of Engineers Pick and two subordinates for waste on the air bases being built in Morocco for the Air Force. And that development was followed quickly by a report that there would soon be a top-level review of "the relationship between the Air Force and the Army Corps of Engineers."

Such a review would be up to the incoming Secretary of Defense—but Senator Lyndon Johnson's Preparedness Subcommittee released an exchange of letters with Secretary of Air Finletter—suggesting such a check.

Observers come up with only one opinion as to what it all means; not so much censure of the Corps, but rather continuing assertion of Congress' intention to keep a heavy hand on the spending check-rein for all government agencies.

• **NATO building programs down**—That $400-odd million for air base construction work for the North Atlantic Treaty Organization (ENR Dec 4, p. 19) may go through but you can expect heavy cuts in other NATO building. Foreign ministers, meeting at Paris, had given that sad news to U. S. representatives, who were pushing for more—not less—work by other members of the organization.

• **Atom work coming up**—The prediction by T. Keith Glennan of AEC (ENR Dec. 4, p. 21) that the time is coming to open up atom power to commercial use is a lot closer to the mark than many suspected.

A report last week from the Joint Congressional Committee on Atomic Energy (after a series of confidential conferences with electric utilities, among others) showed this much:

Industry is well aware of the potential, and is ready to go to work on harnessing the atom to peaceful uses whenever it gets the signal. And there'll be plenty of construction involved—once the research is completed to a safe stage. One thing that bothers everybody is the staggering initial cost—estimates fix $50 million as cost of the first pilot operation.

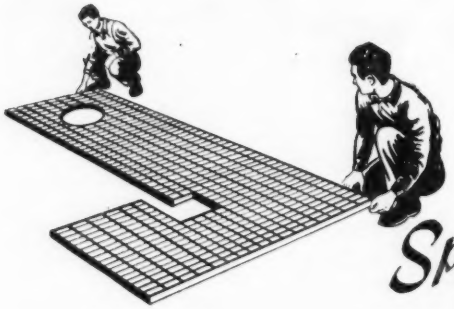
• **Air base to the north**—U. S. plans for major expansion of the big war-built Goose Bay, Labrador, air field are in high gear now, with granting by Canada of a 20-year lease on an additional 7,000 acres of land at the site. (U. S. holds the original base on a 99-year lease.)

New runways, plane facilities, troop housing, are on the books.

• **Money for health**—Something like $150-million worth of hospital and medical school construction each year for several years after current legislation expires (fiscal 1955) is called for in new report to Mr. Truman—and there's more than an even chance that the program will carry weight with the new administration.

The call for spending came from the President's Commission on the Health Needs of the Nation (appointed after plans for national health insurance bogged down in Congress). It recommended an annual outlay of $75 million for new hospitals, another $75 million for expansion of training facilities, modernization of hospitals and local health service facilities.

Interesting point is this: Head of the 15-man commission is Dr. Paul Magnuson, a Republican—and so many of its recommendations fit so closely into expressed ideas of President-elect Eisenhower that most Washington observers feel they may become a framework for the new administration's health and welfare program.



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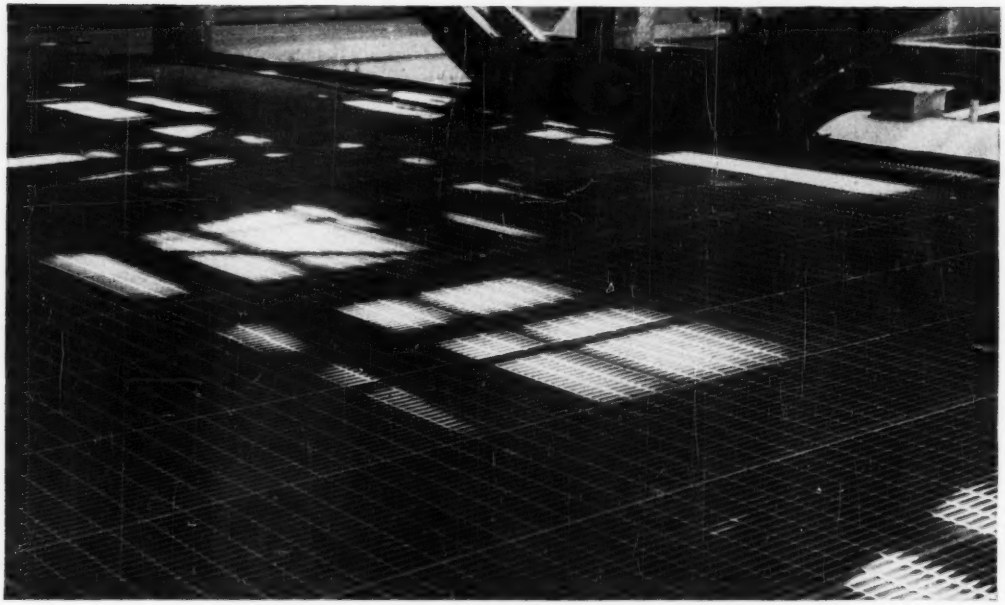

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Congress sees high rate of building through 1960

Joint Economic Committee report, looking ahead for next eight years, says following is needed to maintain prosperity:

- **$300 billion for plant and equipment**
- **$100 billion for housing construction**
- **$60 billion for highway construction**
- **$40 billion for schools and hospitals**

The construction industry can look forward to a decade of activity equal to or better than its current prosperous level, according to a long-term economic look ahead completed this week by a congressional committee.

The study, made by the staff of the Joint Committee on the Economic Report, found two factors that it considers capable of sustaining the economy at its current high level until 1960:

- Demands created by an unprecedented population growth of 24,000,000 during the decade will produce a 175,000,000 population by 1960.
- Demands on the economy that will stem from maintaining a military force of 3,500,000 men and keeping it supplied with the latest weapons.

These factors, the report concluded, will produce the demand forces to call for an expenditure of $500 billion for investments between now and 1960.

Construction will share heavily in all facets of such an expenditure.

• Role of public works—Further, the advance planning of public works can be used to level out any economic ups and downs the industry runs into. Public works, which have been held back during heavy military and private construction during and following World War II, have been planned so that they can be turned on to take up any construction slack.

The federal government has $3.5 billion in civil works that it will complete during 1953 and $16 billion more planned for after 1953. In addition, states, local authorities, and cooperatives that get federal loans and grants have completed plans for $3 billion of construction projects and another $4 billion in the planning stage.

• Role of industry—In the field of plant and equipment investment, the report noted that although outlays reached unprecedented levels in the postwar period, the outlook still is bullish.

It was found that most industrialists intend to stick by expansion plans, regardless of a business turndown in between, in order to be ready for the enlarged markets that they see ahead in 1960 and beyond. Because the depression and war years interrupted normal rate of growth, there is a heavy backlog of planned expansion.

The report estimated private outlays for producers' durable equipment and new construction (non-residential) in constant 1939 dollar for the 1950 decade at roughly $200 billion. That compares with $135 billion for the 1940-50 decade.

• Housing outlook—In the field of housing, requirements for the remainder of the decade will average at least as high as the annual average during the "good years" of 1947 to 1952 to house the increased population and not lower present standards. The committee estimated the following housing demands for the decade:

- New units needed to keep up with population growth.....6,800,000
- New units to replace estimated loss through disaster and removal of temporary housing 700,000
- Replacements to maintain existing units, assuming life-service of 75 years per unit 1,500,000
- Need to raise general housing standards by eliminating 50% of substandard housing 3,200,000
- Total new units.....12,200,000
- Less those started since 1950 2,500,000
- Estimated total new construction and rehabilitation 9,700,000

• More highways—In highway construction, the report estimated that it will require an annual expenditure of $7 billion for the remainder of the decade to maintain and modernize existing roads to meet the growing automotive demands.

Such an annual outlay compares with the $4.2 billion spent in 1951. In its study, the committee estimated that the number of trucks will increase from 8,100,000 in 1951 to 10,000,000 by 1960. Because of the lag in road construction in relation to increase in the number of vehicles, the report found there will be heavy pressure throughout the rest of the decade to step up road building to relieve the congestion that plagues every metropolitan area, and most smaller cities.

• Other building—In public works, the report found that the lag in school construction will be a continuing factor for new construction. To house the current level of public school enrollment will call for accelerated construction for the next three or four years. On top of that the report found prospects of a 27% increase in school enrollment during the decade. The Office of Education foresees a demand for $10 billion of additional construction, broken down as follows:

- To take care of accumulated backlog .....$10 billion
- To provide for increased enrollment .....$6 billion
- To replace existing facilities $4 billion

(Based on 50-year service-life.)

Also in the public works field, the report estimated that $14 billion in additional hospital beds is needed to meet minimum standards of the Public Health Service Act. This breaks down into an estimate of $1.1 billion in new hospital construction for 1953, rising to a level of $2.5 billion in 1955 and holding steady until 1960 when it will drop to $1.9 billion.

Year-end completion of the work of the outgoing 82nd Congress produced last week three committee reports bearing on the future of the construction industry: One deals with the long-range outlook for construction (above), the other two with public works projects **(see page 27).**

All three will be in the middle of any Republican attempts to tackle the same problems.

The long-range estimate of levels of construction required by a "full-employment economy" is the product of the staff members of the Joint Economic Committee; the two reports on the big public works projects are backed by Congressman Dondero, who, as chairman of the House Public Works Committee, will be one of the key authorities in the field for the next few years.

TYPICAL OF WHAT'S AHEAD, this blighted area on Chicago's near south side is being redeveloped into a 2,000-apartment community to house 7,000 people. Major units include two 23-story apartments, 11 two-story apartments, a shopping center, school, park and five 12-story apartment buildings—four of which are under construction. The 101-acre site was acquired by the Chicago Land Clearance Commission, the New York Insurance Co. is the redeveloper. (Chicago Aerial Survey Co. photo)

Cities plan $10 billion to rebuild blighted areas

- **Next few years to see construction surge**
- **Sparked by completion of preliminary plans**

The nation today stands on the brink of the largest era of urban redevelopment in its history. Rebuilding of blighted areas surrounding the business cores of American cities will create up to $10 billion of construction business in the next few years—the product of several years of preliminary planning.

At least 15 cities have redevelopment projects in the active state of construction or land acquisition. Within six to 12 months, 100 additional cities and towns will begin assembling land for redevelopment of deteriorated areas.

Under state redevelopment laws, several cities had started the initial phases of area rehabilitation before 1949. But it was under the Housing Act of 1949, that the trend gathered momentum.

Up to that time local redevelopment had been blocked by the big money loss involved in preparing blighted areas for better uses. The Housing Act of 1949 recognized slums as no less a national than a local liability.

To help reduce that liability, the law offered local communities federal cash grants paying up to two-thirds of the net cost incurred in preparing sites for qualified redevelopment projects. Further, a city is entitled to a cash credit—toward its share of the net cost—on the municipal capital improvements it has to make to put the site in shape for redevelopment.

• **What is happening**—Of 110 projects that have successfully passed the preliminary planning phase and are now in the final stages of planning or physical redevelopment, only eleven will be entirely for housing, and only 56 will be predominantly residential.

Eight of the projects will be developed exclusively for industrial use and ten exclusively for commercial use. In addition, eleven projects will be predominantly industrial, and nine predominantly commercial. Only four of the projects will serve predominant public uses—schools, playgrounds, parks, etc.

Final planning calls for firm determination of building requirements for the project's area, including population density, building coverage and land use standards. Actual design of buildings to be erected on the project is left, of course, to the developer who later buys—or leases—the land.

Under active development Dec. 1 were 23 projects which had progressed either to land assembly and clearing by the local authority or to building construction by the developer.

• **Full speed ahead**—Considering the time-consuming labors that a city experiences in starting an urban redevelopment program, nationwide progress in two years has been good. Much of the heavy spade work already had been done in 75 communities that are well along toward redeveloping 110 project areas. In addition, more than 100 municipal redevelopment authorities are in the throes of the preliminary planning that will fix the project boundaries and land uses for the areas to be rebuilt in their communities.

In all, more than 250 communities—by resolution of the governing body in each—have asked for and have been given federal grant reservations to take care of up to two-thirds of the write down cost of proposed projects.

The total of capital grant funds set aside amounts to about $200 million. Congress won't have to authorize any more money to keep the program rolling for another two years.

• **Other aid**—Grants are not the only federal aids available to cities. Communities also borrow money from HHFA to assist their redevelopment work. Congress set up $1 billion for this purpose in the 1949 law. So far HHFA has approved applications for less than $50 million in advances and loans out of this fund. Cities can borrow federal money if necessary to finance preliminary and final planning, land acquisition and site clearing. HHFA also can make loans to finance public facilities needed to serve and support projects carried out on predominantly open land. The law allows redevelopment of open areas that will be used principally for housing.

On the basis of experience on the first 50 projects to appropriations, grants will support gross costs of $1.1 billion for project area land prepared for redevelopment. Of the first 104 projects to be approved, about two-thirds are mainly for residential uses. The projects call for erection of housing structures and probably an equal amount of commercial and industrial construction.

• **Plenty ahead**—Over the next few years the federal program can support the redevelopment of probably 1,000

project areas. Estimating the total volume of potential construction is largely guesswork, but it is no exaggeration to say that $7 to $10 billion of work could easily flow out of the federal program already authorized.

And Republicans are just as keen for urban redevelopment as Democrats. If the federal funds should run low, a Republican Congress could be relied upon to vote more money. In addition to national benefits, the federal costs are low.

All sizes of communities are participating in the federal program. The list of places that have grant reservations ranges from six of over a million population and 13 in the half-million to a million class down to 69 communities of less than 25,000.

• Example in Chicago

Like other large cities, Chicago is suffering from a municipal cancer to the extent of having 23 sq mi of blighted and slum areas choking The Loop.

For the past five years, however, significant advances have been made in reclaiming the city's distressed areas through the process of acquiring blighted property, clearing it and selling to private interests for redevelopment.

As shown in the accompanying table, Chicago has on its books $1.2-billion worth of urban redevelopment. These are not dream projects, but undertakings currently under way—sponsored either by public agencies, private interests or institutions. Of this total $236 million (or 20%) represents expenditures made to date.

Here is a quick rundown:

• **Land clearance**—Keystone of the redevelopment is the Chicago Land Clearance Commission. To date the commission has 227 acres of blighted area in approved project development stages, and an additional 250 acres under study.

Currently the commission has four large, active projects for private rebuilding at an estimated cost of $84 million.

• The biggest project covers a 20-block area on the South Side, between 31st and 35th Streets, immediately east of South Parkway. The New York Life Insurance Co. is developing this area, called Lake Meadows, for apartment dwelling (See photo above). All but 3% of this 101-acre tract has been acquired.

• Project No. 2 of the Land Clearance Commission is the redemption of a tax-delinquent, "dead" subdivision on the Southwest Side. It covers 40 acres of vacant property between Southwestern Ave. and Rockwell St., and between West 77th and 79th Streets. This redevelopment program calls for the erection of 160 single-family houses for sale.

Acquisition of this property has been suspended, since a decision last month by the Illinois Supreme Court held unconstitutional a 1949 amendment to the Blighted Areas Redevelopment Act of 1947.

• The commission's third redevelopment project is strictly for industry. It covers 52 acres on the Near West Side—from West Polk St. to Roosevelt Rd. and from South Canal St. to the proposed South Superhighway just east of Halsted St. The commission is acquiring the property, will clear it and sell it to private interests for redevelopment as a light industrial district.

• The fourth major enterprise is a new departure in urban redevelopment. Not only will it reclaim a slum area for housing, but it will revive an even larger neighborhood, now in decline.

More redevelopment is being accomplished by expressways, public housing, parks, institutions, schools, and motor truck terminals.

• Other cities active

Redevelopment of Chicago is but one example of projects underway in most major cities across the country. Particularly active are projects in: New York, Philadelphia, Baltimore, Detroit, Norfolk, Nashville, Montgomery, Mobile, Indianapolis, St. Paul, and San Francisco, covered in previous ENGINEERING NEWS-RECORD articles.

In some cities—notably Cleveland and Los Angeles—urban redevelopment by public housing is being bitterly fought by private home builders and real estate interests. Here is a sample:

In Cleveland last week advocates and opponents of public housing clashed at a hearing before the city council's legislative committee on an ordinance to outlaw public housing in the city.

Meanwhile the urban redevelopment programs in all Ohio cities face a crucial test in a case now before the Ohio Supreme Court.

The decision will determine whether urban redevelopment is a "proper public purpose" for which federal funds can be used to acquire land later to be used for private development. The court will also decide whether the state redevelopment law is constitutional and whether a city can carry out its program under home rule powers or state law.

• Private enterprise

So far we have been talking about the federal program, which is the most far reaching. But there are big redevelopment projects going on without federal assistance.

Biggest of these is in Pittsburgh, whose urban redevelopment authority

Chicago's major redevelopment programs currently under way

(Public, private and institutional sponsorship)

Project	Sponsor	Total Cost (Estimated) (In millions of dollars)	Expenditure to date (In millions of dollars)
Land clearance and redevelopment	Chicago Land Clearance Commission	$84.0	$10.0
Expressways	City, county & state	$308.3	$40.9
Public schools	Board of Education	$26.7	9.5
Public housing	Chicago Housing Authority	151.5	20.7
Large parks	Chicago Park District	100.0	22.0
Small parks and playgrounds	Bureau of Parks & Recreation	4.0	2.0
Non-profit corporation housing	Chicago Dwellings Association	7.9	0.5
Medical center district	State of Illinois	200.0	75.0
Medical Research Center	Northwestern University	100.0	19.0
Michael Reese Hospital redevelopment area	Michael Reese Hospital	25.0	4.0
Technology Center	Illinois Institute of Technology	4.5	15.0
Motor truck terminal districts	Committee on Motor Truck Terminals	100.0	17.5
		$1,152.4	$236.1

Note: This table, courtesy of the Chicago Plan Commission

is one of the few such agencies in the country to have projects actually in construction and use. Under its direction, the multi-million dollar Gateway Center redevelopment of the "Golden Triangle" financed by Equitable Life Assurance Society of the U. S. embraces 23 acres adjoining 36 acres being developed as the State Point Park (ENR April 24, p. 61).

Construction and land costs to date are more than $40 million and almost $1 million of street improvement by the city. Included are three stainless steel-clad multi-story office buildings, two of which are already occupied. Next structures planned are a hotel, garage and another office building.

Second project of the authority nearing completion on Pittsburgh's south side is an $80-million expansion of industrial facilities by Jones & Laughlin Steel Corp. where 20 acres of blighted housing area existed.

The authority has recently executed a new redevelopment contract for another 30 acres of blighted area in the Hazelwood Section, which will be cleared and converted to industrial use, including $25 million in new coke-oven facilities for J&L.

The authority is now negotiating with Duquesne University for clearance of a 25-acre area to be integrated with the existing campus in a $20-million building program.

• **New approach**—Removal of railroad yards from the heart of downtown Nashville, Tenn., is going to leave a 36-acre area open for new commercial development.

W. S. Hackworth, president of the Nashville, Chattanooga & St. Louis Railway, last week announced an economic survey of the area to be vacated for commercial redevelopment will start the first of the year. When completed, a master plan will be drawn for rehabilitation which eventually may represent an investment of more than $100 million.

The program, now being carried out jointly by NC&STL and the Louisville & Nashville Railroad, calls for removal of the freight-switching tracks in the union station area and for bridging the remaining passenger tracks leading into the depot. This will allow commercial and light industrial development at both ground and viaduct level. First sites should be available early in 1953, and redevelopment should be in full swing by mid-1955.

The timetable for bridging the downtown railroad gulch which long has choked Nashville's business center is dependent on progress of the joint L&N-NC&STL $14-million expansion at Radnor Yards on the city's outskirts (ENR Nov. 20, p. 2) now 20% complete.

Contractors prepare for fight over bid shopping legislation

• New York builders review separate contracts law

• Find lessons apply to bill before Congress

It is now clear that the battle between general contractors and some of the mechanical specialty contractor associations over bid shopping will be fought out again over legislation to be brought up at the coming session of Congress.

While efforts to settle differences over subcontracts within the industry and without resort to legislation are meeting success in some local areas, both sides are girding for battle at the national level. The Associated General Contractors and allied organizations are busily preparing evidence that legislation to force separate mechanical contracts would hurt construction. The National Electrical Contractors Association and its allied associations of plumbing and heating and ventilating contractors are working to prove such laws are sorely needed.

Sure to play an important role in the controversy are plans being readied in New York, largest construction center in the country. Here the Metropolitan Builders, the Public Building Contractors, and the Building Contractors and Mason Builders—top organizations of general contractors—have formed task force committees.

These committees are hard at work gathering facts and preparing to marshal evidence against the threat to the principle of single responsibility. They have an abundance of material close at hand to draw from, much of it providing caution signals for Congress.

• **New York law**—Section 135 of the State Finance Law has been with New York in one form or another since 1909. It applies to all state and municipal building, and provides that, in addition to the contract for general construction work on a project, separate contracts must also be awarded for: electrical wiring and illuminating fixtures; plumbing and gas fitting; and heating, ventilating and air conditioning. It requires specifications so drawn as to permit separate and independent bidding for these contracts, and the award of contracts to the lowest responsible bidder.

All efforts to repeal this law have failed. Today New York's construction industry generally regards the law as impregnable as the Rock of Gibraltar. Both general contractors and the mechanical specialty contractors have learned to live with it.

The general contractors who fought it believe that they have done more than their duty in the public interest. They are now content, in their words, to let the public pay for the cost of the system until the public becomes aroused enough to change it—and this does not appear at all likely.

• **From generals' viewpoint**—The general contractors in New York point to evidence that public buildings constructed under separate contracts cost more.

• They point out that tons of increased paper work and scores of additional clerks are required to make the system work. In New York, where public projects are split into four pieces, four complete processings of paper are required.

• The contractors bidding on a project do not know what other contractors will be working with them. Since one weak "sub" can impair the project and reduce the profit, the tendency is to provide a contingency for this added element of risk. The contractor for general construction work includes a higher contingency; so do the contractors for the mechanical specialties. Also, there is more opportunity for collusive bidding. So the bids tend to be higher.

• Projects constructed under separate contracts force the state or municipality and its building designers into the role of general contractors.

• Disputes occurring under separation of contracts cause delays in construction and sometimes hurt the quality of the work. This also adds to the taxpayer's expense.

• **Specialty contractor view**—Separation of contracts in New York State came about through pressure from the same employers associations in the mechanical specialty trades that are now in the forefront of the effort to have Congress pass legislation on bid shopping.

While no contractor in these mechanical specialties has publicly opposed the policies of the associations, many have refused to support the policies and unofficially have informed general contractors of their opposition. Few seriously contend that separation of contracts saves the public any money.

Primarily, those supporting the leg-

islation are looking for protection. The people they're aiming at are the fly-by-night outfits that suddenly blossom out as general contractors, and who figure to make their money by squeezing the subs. They also want protection from competition of greedy subs who take a job low, figuring to put the squeeze on labor to get their profit. And they want rules against a general contractor who is financially unable to pay for subcontractor services until he is paid for the completed job.

New York's separate contracts law provides this protection better than no law at all, they contended. So they are satisfied with it.

The state's two biggest contractor groups—the Building Industry Employers Association and New York City's Building Trades Employers Association—have taken no official position in the controversy. Membership in the groups is too evenly divided between general and subcontractors. This non-committal attitude has played at least a nominal part in causing some members of the NECA to pull out of local builders' exchanges upstate.

• **Labor's role**—The AFL building trades in New York generally have avoided taking an active role in the controversy. Their leaders tell you, privately over the lunch table, that separation of contracts is costly and that the real answer is some system requiring prequalification and prenaming of subs before bids are taken.

They want protection for the subs, if subs are going to squeeze labor as a result of bid shopping. They say separation of contracts has reduced this practice, so in the absence of any showdown fight they are inclined to go along.

• **Results**—Public building construction under separation of contracts is working out at the state level better than at the municipal level. There is good reason for this.

Construction of state public buildings comes under N. Y. State's Division of General Construction in the Department of Public Works—one of the most highly centralized state organizations for public building construction in the country.

The division is headed by efficient, affable State Architect Cornelius White. General contractors and contractors in the mechanical specialties alike admire him, and agree that his organization is doing an excellent job of minimizing the difficulties under separation of contracts.

• **Big job**—White's job is a sizable one: By the end of this year, it is estimated, the state will have awarded 525 formal contracts and 375 short-form contracts at a total cost of $40 million. Next year the value of building contracts is expected to rise to $60 million, including some of the largest projects in the history of the department.

CORNELIUS WHITE is making a tough job work out.

To do this job, White's division is employing 504 persons, at latest count, who are directly concerned with planning and supervising building construction. This includes the main office in Albany and a field force scattered in ten district offices throughout the state. The field force, made up of persons actually engaged in supervising building construction, totals 190. This compares favorably with the staffs of the largest private building construction firms in the country.

The Division of General Construction makes the separate contracts law work under a strict set of regulations (latest were published last June), and strong supervision with authority to make prompt decisions. Samples from the regulations are these:

• If the contractor for construction work does not build openings, channels, flues, etc., as required by drawings or written information from the specialty contractors, he must do the necessary cutting and finishing at his own expense. But if the other contractors fail to furnish drawings or written information on these things they want, they must do the cutting and refinishing at their own expense.

• Where completion of one contractor's work depends upon the work of another, the contractor must inspect and report to the State Architect any defects that make it unsuitable for him to do his job. His failure to inspect and report means acceptance of the other work as ready for his own work.

• If one contractor fails to furnish an adequate plan or to supply a sufficient number of workmen to "prosecute the work diligently," or causes unnecessary delays, his contract can be canceled on seven days' notice.

• The state is not responsible for damages resulting from disputes between contractors.

• **Less fortunate**—But, while the state is able to step in and play the role of general contractor efficiently, municipalities often do not have the staff or money to make their projects go so smoothly.

Small municipalities and their school boards generally must rely on the building designer to take over the role of general contractor under separation of contracts. Even big agencies such as the New York City Housing Authority and the Department of General Education, find construction under this law full of thorny problems.

At the municipal level, both the general and the mechanical specialty contractors agree that separation of contracts breeds continual disputes among the contract holders. Timing of work schedules, size of the supervisory and working forces, scope of the work to be done under the different contracts, and other problems provide sources of friction.

For an insight into the cause and results of intra-contractor rows, let's look at two examples:

• On calendar for trial in the Supreme Court of New York County next year, is a dispute between Psaty-Thompson-Grove and Bank Electric Co., that arose during construction of the Pelham Parkway Housing Project in New York.

The suit was brought by Bank Electric charging that Psaty-Thompson-Grove poured concrete and removed forms in such a way as to require conduits to be chopped out and relocated, and receptacle boxes to be reinstalled. The firm asks $35,605 damages.

Bank Electric claims it had all of the conduits laid out and the receptacles in place according to the plans for the building. When the concrete was poured, the beams, columns and wall partitions were not aligned according to the plans, and so the conduits and receptacles were out of position.

Psaty-Thompson-Grove are starting a countersuit to recover the cost of finishing work required after Bank Electric chopped up the concrete to relocate its conduits and reinstall its receptacles. According to P-T-G, Bank Electric did not keep a mechanic on the job to watch and adjust the conduit as the concrete was being poured, and that the receptacles were out of position because of improper engineering services.

• During construction of the Lillian

Wald Housing Project in New York, a dispute arose between HRH Construction Co., holding contracts for foundation and general construction, and Rao Electrical Equipment Co., Inc., over who was to provide temporary lighting required for construction work.

The dispute could not be settled by discussion between Rao and HRH, so both parties agreed to submit to arbitration before Henry Epstein, and both firms presented their case. The arbitrator ruled in favor of HRH. Rao was directed to pay HRH $4,506 for the cost of temporary lighting (which money HRH had paid already to permit construction to progress), and also to pay the arbitrator's fee.

These two cases show the kind of disputes that arise. Hundreds of others never reach the stage of formal legal action, but nevertheless delay work. Just as the state does, municipalities write into their contracts a provision that they are not liable for damages resulting from contractors' disputes.

• **The outlook**—The bid-shopping legislation before Congress does not provide for separation of contracts. But it would require the general contractor to list his subcontractors on mechanical specialties, and it would limit his power to select his subcontractors or do the work himself.

The same as under separation of contracts, the mechanical specialty contractors are looking for protection. The generals see the legislation threatening single responsibility, increasing the cost of construction, and creating more red tape and controls.

Because of the similar purposes of separation of contracts and the pending bid-shopping legislation, general contractors point out that the difficulties encountered under the one can be expected to occur under the other. The shortcomings of one indicate the weaknesses of the other, even if there is a difference of degree. And while bid-shopping legislation is less drastic than separation of contracts, its weaknesses would be multiplied many times by the size and scope of federal construction that would be affected, they say.

At a recent meeting of the Building Contractors and Mason Builders Assn., during discussion of a resolution opposing the federal legislation, this point was made: "No responsible general contractor wants to be forced into a shotgun marriage with a subcontractor of whose responsibility . . . he may have doubt. Inasmuch as the general contractor is ultimately responsible for the entire contract, most high-grade contractors would rather refrain from competing under such circumstances."

Straus resigns as Reclamation chief, bureau urges $2.1-billion budget

The expected resignation of Reclamation Commissioner Michael W. Straus was turned in to Secretary of Interior Oscar Chapman last week, and its acceptance appeared a foregone conclusion. Republican Secretary of Interior-designate Gov. Douglas McKay of Oregon already had indicated his intention to relieve Straus after Eisenhower becomes President on January 20.

Straus has been a controversial figure during most of his seven years as Reclamation commissioner. He will be the first commissioner in 50 years of federal reclamation to go out of office through a resignation to a new President.

On the same day he submitted his resignation, Straus was among 20 to receive Interior Department distinguished service awards. He was cited by Chapman for launching the government's synthetic fuels program and directing the Reclamation Bureau to accomplish a program expansion from a level of $50 million a year to $300 million a year.

• **What's ahead?**—The Bureau of Reclamation, minus Straus, will hand to the 83rd Congress when it convenes Jan. 2 a seven-year program of proposed construction work calling for a total cash expenditure of $2.1 billion.

Embracing all projects that the bureau considers feasible for construction in the period 1953-1959, the seven-year program would add more than 3,000,000 irrigated acres and nearly 3,000,000 kw of hydroelectric generating capacity.

Reclamation put the program together at the request of the outgoing House Interior Committee. It is the first projection of this kind since outgoing Commissioner Straus submitted a similar requested report in 1948 for the seven-year period 1948-54. By comparison, the present program is modest. The earlier program proposed the spending of $3.9 billion in seven years.

To the bureau, of course, the preparation of a seven-year program is routine. As a regular practice, the bureau each year brings up to date its projection of programmed work for six years ahead.

The program that will go to Congress in January calls for completion of all projects now under way and, in addition, includes an inventory of all water, irrigation and power development works that could logically be started within the seven years.

By dollar amounts to be spent each year, the program breaks down this way:

Year	Expenditures (millions of dollars)
1953	220
1954	257
1955	346
1956	412
1957	357
1958	285
1959	231

In addition to projects that Congress has already authorized, the proposed program includes other developments—particularly, Hells Canyon on the Snake River in Idaho—that Congress has considered but has not yet authorized.

Reclamation development of the West is sure to continue under a Republican-controlled Congress. Choice of projects and of policies to govern them may be changed, but the volume of work probably will be about the same as under the Democrats.

Little Hoover Report commends highway agency

Pennsylvania's "Little Hoover Commission," which has been sharply criticizing the operation of state agencies, is kind to the state highway department in its latest report. It calls the department's $150-million-a-year job of maintaining and constructing 41,000 mi of highways, "well administered and run in an economical manner."

But the report does suggest ways to save money:

• In the construction of multiple-lane highways greater use should be made of the practice of separating opposing lanes, both in alignment and grade, to take advantage of the most suitable terrain. The saving in construction costs would more than offset the additional cost of the wider rights-of-way.

• There is a tendency toward over-design for rural roads carrying low volumes of traffic. Insistence on perfect alignment and grades of these roads frequently results in exorbitant property damage and right-of-way settlement. Simpler design of rural roads would cut construction and right-of-way costs and still be satisfactory.

The committee recommended that a special right-of-way chief be named to cope with "the enormous rise in right-of-way expenditures in recent years." It was alarmed also by the attrition of younger technical engineering personnel in the department.

Estimates and costs on public works criticized by congressional group

The maze of figures which government agencies use to justify waterway development projects is just as mystifying to Congress as to the contractor who eventually may build the project.

To bring some order out of the chaos, a House Public Works Subcommittee last week recommended a more systematic method of presenting the figures used to justify undertaking the projects. The recommendations came in two hard-hitting reports.

Like the reports issued the previous week (ENR Dec. 18, p. 21), these called for closer congressional control over the Army Corps of Engineers and the Bureau of Reclamation, which are the government's two largest civil works construction agencies.

First of these two recent reports takes a hefty swing at the cost-to-benefit ratio presentations of the two construction agencies. The general idea of this formula is that a project is justified if it can be shown that benefits to be derived exceed the construction and operating costs.

Such a figure can be informative, says the subcommittee, "But the present trend seems to be toward development of a figure which would be more deceptive than helpful." It is possible to make fairly sound estimates on benefits to be derived from the flood control, hydroelectric and navigation portions of a project, but the less direct benefits such as recreation, and aiding the national economy, are impossible to calculate.

Concluded the committee: "Some of the efforts to place monetary values on indirect benefits are nothing short of ludicrous."

To keep the justification figures on sound ground, the committee recommends that the constructing agencies stick strictly to project costs and tangible benefits in presenting their cost-to-benefit figures. Indirect and intangible costs and benefits should be given separately with estimate of their monetary value as may appear realistic.

• **Costs scored**—The second subcommittee report criticized the wide variety of methods used in allocating investment costs to various functions of multi-purpose projects. As with economic evaluation of the projects, there is also a lack of coordination among government agencies in allocating costs.

The subcommittee recommends no rigid rules for allocations but believes these agencies should be warned not to indulge in unrealistic or irrational allocation procedures directed to justify some preconceived solution.

To correct receptive procedures now used, subcommittee recommends:

- All costs of water-resource projects should be allocated so that each authorized purpose of the project will bear its own fair share of these costs and share equitably in economies resulting from use of a multi-purpose project.
- The constructing agency should make original cost allocations for the various functions and the other agencies concerned should comment on these allocations.
- Bureau of the Budget should coordinate these allocations both in the tentative and final form.
- All reports to Congress recommending authorization of such projects should contain a full report on cost allocations.
- Congress should be fully informed of any changes in these allocations.
- Final allocations of capital cost should be made only upon completion of construction when all investment costs are known.

No bids cause change in New York bridge

The record-breaking 1,112-ft tied-arch span planned for the Hudson River crossing of the New York State Thruway, from Tarrytown to Nyack will probably not be built.

This was the disappointing news announced by the thruway authority, Dec. 16, after it failed to receive a bid from any of the steel fabricating and erecting companies. The apparent reason for the lack of bidders was the inability of the companies to meet the state's estimated cost of $35,764,000 for the entire 15,000-ft structure, which figured out at $560 per ton overall and $860 per ton for the tied-arch span alone. Under New York State law no contract can be let for more than the engineer's estimate, which is required to be made public.

A substitute for the tied-arch, which would have been a remarkable structure—nearly twice as long as any yet built in the U. S. and with a 15-ft deep rib and a 12-ft deep tie, the authority's consulting engineers, Madigan-Hyland and their associate in charge, Emil Praeger, are preparing designs for a cantilever truss bridge. Simple erection and the fact that the approach structures can be bid separately are said to be two of the reasons why it is expected that the cantilever design can be built within the estimated cost.

Only a slight delay will be occasioned by the re-design, which has been under way for several months—or since it first became apparent that there probably would be no bids on the tied-arch. Also the foundations are already in the construction stage—under three contracts totaling $19 million, two of which are held by Merritt-Chapman & Scott Corp. and one by the Construction Aggregates Corp.—and only minor changes are required.

As originally laid out, the bridge contained 8,000 ft of rolled-beam spans on trestle supports, about 5,000 ft of 250-ft deck-girder spans, and two 400-ft deck-girder spans flanking the main 1,112-ft tied-arch span. It had been suggested in the call for bids that the tied-arch could be erected by utilizing the girders from the 400-ft spans and other steel from the shorter girder spans as a temporary platform that could be supported by two falsework bents set 350 ft out from each main pier. It was because the permanent-approach steel would be useful in the erection of the main span that the entire bridge was offered as a single contract.

The proposed new design will retain the same approach except that the 400-ft girders flanking the main span will give way to 600-ft anchor arms for the cantilever whose main span will be the same as that planned for the tied-arch—1,112 ft. Since the 600-ft anchor spans will replace the 400-ft girder spans and 200 ft of the adjacent 250-ft spans, two of the originally planned piers can be eliminated. The next two piers shoreward also probably will be respaced to achieve economical span lengths. Construction of these piers has not yet begun.

B. D. Tallamy, chairman of New York State Thruway Authority has stated that bids on the new design superstructure will be invited at an early date, and that the project will be broken down into several contracts to obtain a broader field of competition.

Bridge builder's dream

Within the next month, Michigan's Mackinac Bridge Authority will offer $90-$100 million in revenue bonds to finance a five-mi bridge linking the state's upper and lower peninsulas over the Straits of Mackinac.

Since about 1880, a bridge across the Straits has been an engineer's dream. The proposed structure will have a 3,800-ft center span suspended from towers more than 500 ft high, and will carry four lanes of traffic.

On the basis of traffic estimates, the authority believes the toll bridge could be paid off in about 20 years if completed by 1958, but current plans call for 35-year maturities.

SECOND QUARTER 1953 ALLOTMENTS

	STEEL (tons)		COPPER (000 lbs.)		ALUM (000 lbs.)	
	1Q 1953	2Q 1953	1Q 1953	2Q 1953	1Q 1953	2Q 1953
Atomic Energy	245,851	203,526	6,256	5,990	6,153	6,590
Civil Functions	12,325	17,124	540	575	416	497
Defense Electric Power Administration	221,248	289,935	62,032	64,980	50,000	48,500
Defense Transport Administration	63,098	74,850	2,319	1,780	140	70
Education	109,381	116,785	5,874	4,400	230	195
Hospitals	56,574	74,140	3,768	3,245	390	276
Housing and Home Finance	62,870	43,000	3,280	2,250	10	.....
Interior	5,808	10,003	80	114	9	10
Public Roads	305,164	372,508	980	1,106	130	200
Veterans Administration	6,165	6,205	604	770	28	60
Aluminum and Magnesium	.....	.....	.....	.....	650	1,250
Building Materials	600,713	792,985	75,122	82,249	87,261	71,481
Facilities Bureau	630,762	765,642	24,468	23,070	7,970	7,306
Iron and Steel	110,043	168,170	5,296	5,080	110	140
Lumber and Wood Prods	4,033	2,691	156	84	865	686

Metals allocations still tight

Despite increases in supplies of carbon steel for the March-June quarter of next year, there's no such good news for some of the key construction materials—heavy structural steel, copper and aluminum.

Unless the Republican Congress votes to continue allocations, this will be the last for the big three controlled materials—steel, copper, and aluminum.

Defense Production Administration said that supplies of heavy structurals, steel plate, and nickel stainless will be about the same as they were during the third quarter of 1952—while state requirements came to about 140% of supply.

Copper supplies for the second quarter next year will be slightly off from previous quarters.

Any increase in new aluminum production facilities was offset by production losses caused by water and power shortages in Western producing centers.

DPA claimed that the allocations give "maximum support" to expansion of the electric power and aviation gasoline industries. Other industries getting increased steel supplies included highway construction, inland waterways, railroads, trucks, and automobiles. Allocations of steel to housing will permit starts to continue at a one-million-per-year rate.

Seaboard to build $7-million rail yard

Construction is expected to start within the next 60 days on a $7-million hump-type freight classification yard for the Seaboard Air Line Railroad at Hamlet, N. C. Hamlet is one of the busiest terminals since it is located where five of Seaboard's lines converge.

Bids for the grading will be asked in February and this part of the work is scheduled to be completed by November. The laying of track will begin in June and will take about 14 months to complete. Construction of yard buildings will start next December, according to the initial schedule. Work on the entire project is expected to extend through 1954.

Altogether, the new facility will have a receiving yard, the classification yard, and a departure yard. The classification yard will have automatic car retarders and automatic switching facilities, and the yard will be so arranged that trains may enter it from any direction without disturbing the work of classification.

Construction of the yard will involve approximately 1,000,000 cu yd of grading and the laying of 66 mi of track.

The hump classification yard will have 58 tracks which will vary in car capacity from 12 to 60 cars each. The yard is so designed that an expansion to 80 tracks may be made in the future if desired. Besides the hump classification yard, there will be a flat classification yard to be used in assembling local trains.

A diesel-locomotive repair shop will be constructed adjacent to the new yard. This new facility will cost approximately $1.5 million.

Traffic snarls spur new highway plans

The highway departments of Maryland, Virginia, and the District of Columbia last week came out with a $329-million program designed to relieve traffic congestion in and around the nation's capital.

Principal features of the plan increase capacity of: Washington's downtown street system and suburban centers; important radials; cross-town and cross-country routes. The plan also provides for construction of a $24-million circumferential highway.

To carry out the program, Maryland is slated to spend $75 million, Virginia $62 million, and the District of Columbia $192 million.

• **Here and there**—The Virginia Department of Highways will push a program of four-lane highway building, bridge construction and other work next year. Twenty projects, on which $10 million is being spent during the current fiscal year, provide for construction of 55 mi of four-lane highway. For fiscal 1953-54 another 55 mi will be added at a cost of $10 million. . . . Sixty percent of North Carolina's $200-million secondary roads program has been built with state forces, and the remaining 40% by private contractors, the State Highway Commission has announced. Over contractors' protests, the commission spent $5 million of the original bond issue to purchase its own road-building machinery. It now reports that in the last four years it has built more than 14,000 mi of secondary roads and the small amount remaining out of the $200 million already has been earmarked. . . . A state bond issue of $11.5 million, a one-cent gasoline tax boost, and higher motor vehicle registration fees are among the measures which will be recommended to the 1953 North Dakota legislature to carry out a 20-year improvement program. . . . In a special report to the legislature, the Massachusetts Public Works Department has recommended construction of a $23-million four-lane highway from Medford, Mass., to the New Hampshire line.

• **Bond issues**—Michigan last week sold $20 million in bonds to help finance a trunk of the $25-million Detroit-Toledo limited access expressway. The New Jersey Highway Authority's proposed $250-million bond issue for construction of the Garden State Parkway has been snagged temporarily by a legal suit challenging its constitutionality. Hearings started this week in superior court and an early decision is expected.

CISC blueprints autonomy plan

The Construction Industry Stabilization Commission last week formally presented its plea for more autonomy to the new Wage Stabilization Committee.

A three-man committee, headed by CISC public member Samuel E. Hill, met with WSC public member Harold L. Enarson and handed him a resolution adopted by CISC. In the resolution, CISC asked that WSC review decisions of CISC only when a CISC member dissents, writes an opinion outlining his reasons and specifically requests WSC review. Otherwise, CISC decisions would be final.

Under existing rules, WSC—handling wage controls while the Wage Stabilization Board remains inoperative because of the resignation of industry members—reviews every decision in which CISC approves wage adjustments in the construction industry which exceeds the normal ceilings. These are increases of 10% since June 1950, plus 15 cents an hour for 1952, and welfare benefits costing the contractor not more than 7½ cents an hour.

Seventy-eight CISC cases were among the 200 WSC disposed of at its first session on Monday. These were "pro forma" approvals. A dozen or more other CISC cases, requiring careful study, are also pending. CISC wants a WSC staff member to have authority to act on them.

• **Try higher**—If WSC refuses to delegate the increased authority, CISC plans to go higher up—to Economic Stabilizer Roger L. Putnam or his successor.

CISC members feel that WSC—with no members familiar with the intricate wage practices of the construction industry—should not have the right to impose its judgment over that of the CISC members, (most of them from the industry). Two WSB members who had special knowledge of construction industry wage problems have resigned; they are John T. Dunlop, former public member, and former chairman Archibald Cox, one-time CISC chairman.

Cooperative attitude

Informed sources said that AFL leaders displayed a "cooperative attitude" in their first meeting with Sen. Robert A. Taft to discuss changes in the Taft-Hartley law.

Taft, who is planning to introduce a number of amendments to the labor law when the new Congress convenes, met privately last week with AFL president George Meany, AFL counsel J. Albert Woll, and Richard J. Gray, president of AFL Building Trades Council.

Informants said they did not get around to discussing "details" of the proposed changes, and most of the conversation was devoted to planning future meetings.

Sen. Hubert H. Humphry (D., Minn.) predicted last week that the new Republican Congress will make a "drastic revision" of the Taft-Hartley law to win labor support for the GOP.

Court upholds NLRB fine levied against contractor

Another feud between traditional rivals—the AFL carpenters and the AFL machinists—has been won by the machinists.

The Whittenberg Construction Co. will have to give back pay to 15 workers equal to wages they lost because of a hiring system preferring carpenters to machinists.

The Federal Court of Appeals in Cincinnati has upheld a finding by the National Labor Relations Board that Whittenberg discriminated against members of the IAM by hiring only carpenters on a dismantling job at the Kentucky Ordnance Works in Paducah.

From a total of 50 job applicants, Whittenberg hired 34 men for millwright and machinist work on the project. All those hired were members of the carpenters local. The rest were IAM members.

The company argued that its foreman had not questioned men about union membership in hiring and that all millwrights hired just happened to be carpenters.

But the labor board said the mathematical probability that, all 34 men hired should belong to one union and all 16 rejected should belong to another was so slight—one in five trillion—that Whittenberg could not defend its hiring practice on such grounds.

In addition, the court pointed to other evidence supporting NLRB's order:

• All Whittenberg's hiring officers belonged to the carpenters union.
• The carpenters union refused to clear IAM men for the jobs.
• Whittenberg's plant superintendent held job conferences with the carpenters before hiring on the project was started.

The back-pay award will be computed from Oct. 6, 1949 to the date the project was finished, Feb. 12, 1950.

Labor board orders vote in H-plant dispute

Engineers and technicians working for the Miller Electric Co. on the Savannah River hydrogen-bomb plant will vote soon on whether or not they want the American Federation of Technical Engineers, AFL, to represent them.

A dispute between this union and the company recently tied up work on the billion-dollar South Carolina project for one day (ENR Nov. 20, p. 31) and led to an unfair labor practice charge against the company now under investigation by the National Labor Relations Board.

The Miller Co. holds a subcontract from the du Pont Co. for installation of electrical machinery at the atomic plant.

The group to vote in the election some time before Jan. 15 is composed of 57 engineers, engineer trainees, estimators, and draftsmen.

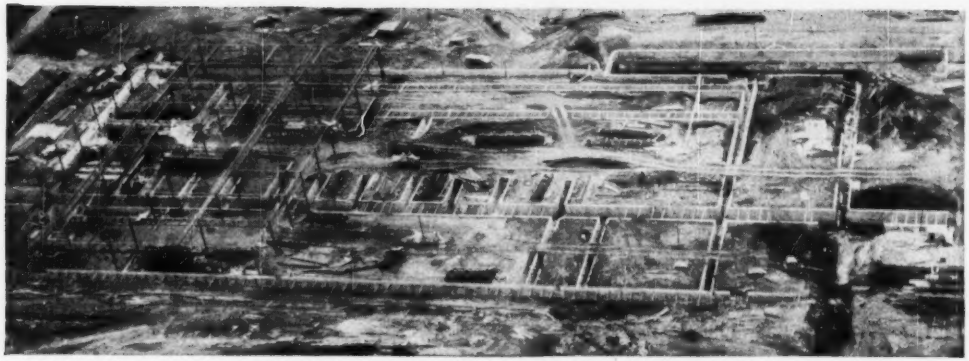
Formal approval

Contractors must be careful not to pay on-site mechanics higher wages until they are formally approved by the Construction Industry Stabilization Commission, even though it is certain that the wages will be accepted.

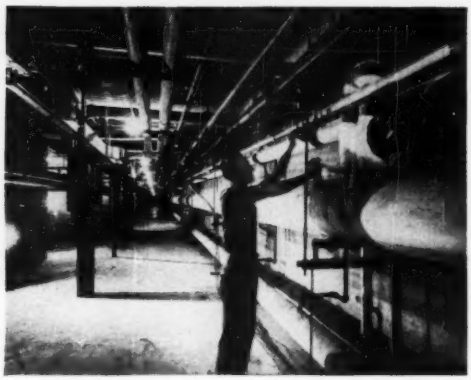
The National Enforcement Commission rebuked its regional commission at Denver, Colo., for making a compromise settlement with five plastering contractors based on lathers' wages which had not been approved by CISC. NEC set aside the settlement and new proceedings likely will be started.

What happened was this:

The new rates for lathers were not approved by CISC until weeks after the settlement. And the approval made clear that it did not excuse any previous violation, including the placing into effect of the approved rates before CISC had approved them.



NETWORK OF MAN-SIZE TUNNELS adds slightly to construction cost of Lily-Tulip Cup plant, but because . . .



PLANT SERVICES are readily accessible, long-range maintenance savings make tunnels sound investment. In addition . . .

UNCLUTTERED CEILING improves plant appearance and promotes safety since high pressure lines are no longer overhead.

Factory service lines go underground

LILY-TULIP CUP CORPORATION's new one-story plant in Springfield, Mo., incorporates a number of unusual features that have been combined to reduce over-all costs considerably. Chief among these is a network of full-size tunnels that contain all service lines required by the 403,000-sq ft paper-container manufacturing facility. The others include cavity-type masonry walls, a pumped-into-place gypsum roof slab, and a spray system that keeps the roof continually wet in the summer time.

Office, warehouse and production areas are housed in a single connected structure. Some 284,000 sq ft in a 273x1,002-ft section are devoted to manufacturing. Paralleling the long dimension is a 152x553-ft warehouse. Both of these areas are framed with lightweight steel sections and have a clear height of 20 ft.

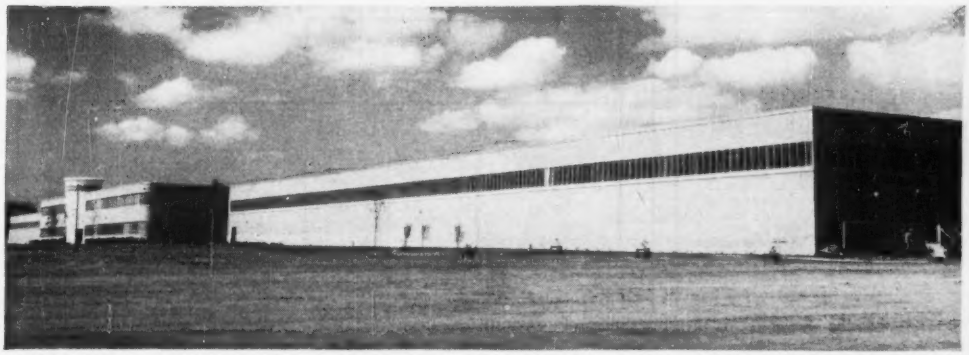
Centered along the other 1,002-ft side of the main area is a two-story office building 40x252 ft. A prominent architectural feature in the front of this building is a huge replica of a paper cup, serving both as an appropriate symbol and as a reception room.

Even though some of the plant's unusual features added slightly to its first construction cost, the over-all figures remain impressive. Including all mechanicals (among them a 1,000-ton air-conditioning system) the entire plant was built for $6.80 per sq ft. A breakdown by area types shows the following square foot costs: $11.00 for the office wing; $7.00 for the manufacturing area; and $5.00 for the storage section. About 10,100,000 cu ft are provided at a cost of 27.1 cents per cu ft.

• **Maze of tunnels**—Although quite novel among today's one-story industrial plants, the network of tunnels was employed on the basis of sound economic reasoning. Normally, all service lines are carried by the roof framework and run down to individual machines. Being so inaccessibly located, maintenance becomes a very expensive and time-consuming process, especially when there are a large number of services, as are necessary in paper-cup manufacture.

Just how much maintenance costs would be reduced by locating all piping in spacious, easily accessible tunnels running directly below each line of machines, was already known by Lily-Tulip officials before they went ahead with the Springfield installation. In 1947, when the company's Augusta, Ga., plant was built, steel was so difficult to obtain that it was deemed advisable to conserve every bit possible by carrying the service lines in tunnels so as to lighten the load on the steel framework and allow reduction in size of sections. About 15% less steel was used.

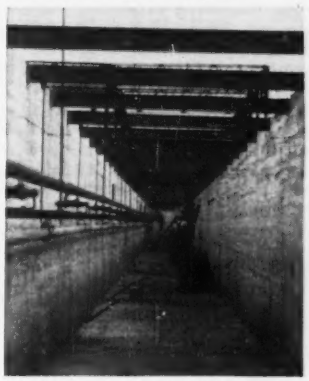
But to the delight of the Lily-Tulip people, the tunnels much more than paid for their slightly increased initial cost. Harlan Carroll, vice-president in



NEW PLANT also features cavity walls, pumped gypsum roof with spray system to keep it cool, and corrugated wire glass windows.

FELT APPLICATING DEVICE speeded laying of built-up roofing.

SPRAY SYSTEM on roof permitted 150-ton cut in air conditioning plant.



SERVICES were installed during construction, allowing earlier occupancy.

charge of manufacturing, conservatively estimates that the maintenance savings will total eight times the initial cost of the tunnels over a 20-year period. Carroll also points out that cleanliness and appearance of the plant is enhanced by the elimination of service lines from overhead. Further, plant safety is promoted since damage due to sudden rupture of a line is confined to the tunnel area.

About the only disadvantage of a tunnel system is lack of flexibility for relocating service lines during a major revamping of production lines. But individual machine replacement is made easier with the tunnels.

So when the Springfield plant was being designed, tunnel construction was a basic planning requirement.

All of the tunnels are 9 ft deep, but vary in width from 5 to 14 ft, depending on the number of services they carry. Side walls are 12-in. thick reinforced concrete. Six-inch I-beams, generally on 8-ft centers, brace the walls at the top and support all service lines and the main plant floor, which is also the tunnel ceiling.

The tunnels contain the following services, most of which are found in any one section: bus duct, electrical conduit, and piping for steam, steam condensate, vacuum, gas, air, chilled water, regular hot and cold water, paraffin wax, and machine drains. The largest pipe size is 12 in., smallest ¾ in.

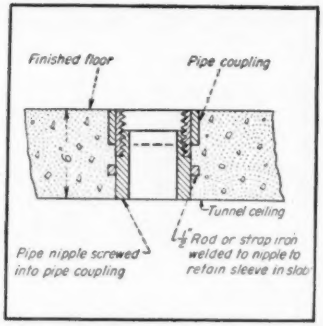
• **Utilize tunnel excavation**—Cost of the tunnels was reduced, compared with Augusta, because of some construction refinements. One such was to balance the amount of tunnel excavation and other cuts with the fill required over the rest of the site. Although a site survey and soil studies were performed, they did not determine how much of the excavated tunnel material would be suitable as fill. Thus, final elevations of tunnels and main floor could not be set during the design stages, but only after excavation began and the contractor had a chance to study soil conditions more carefully.

Tunnel walls and bottoms were then poured directly from ready-mix trucks, and the steel bracing placed. By leaving the roof off, placement of pipe was simplified. It was merely lowered onto hangers instead of carried through long stretches of covered tunnels as at Augusta. An inherent advantage of the tunnel system becomes evident at this point: Services can be installed prior to or coincidentally with wall, structural frame and roof construction, thereby giving the owner earlier occupancy. Lily-Tulip believes it moved into Springfield about 60 days sooner because of the tunnels.

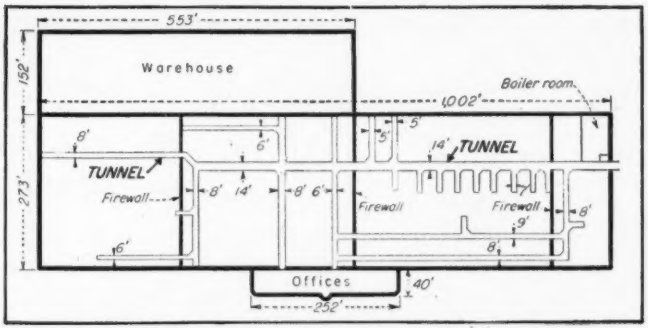
The tunnel roof, actually part of the main floor, was placed toward the end of the job. It consists of a 6-in. reinforced concrete slab over corrugated sheet metal which served as the form. The rest of the floor is 5-in. thick reinforced concrete.

One difficulty with the tunnel roofs is the necessity of accurately locating numerous sleeves for bringing the services to individual machines above. Some units require as many as five or six different lines. An accompanying diagram (p. 32) shows a typical sleeve detail. Flexible couplings are provided above the floor level for conduit.

• **Tunnel costs**—In all, there are 3,660 lin ft of tunnels containing 400,000


Finished floor
Pipe coupling
Tunnel ceiling
½" Rod or strap iron welded to nipple to retain sleeve in slab
Pipe nipple screwed into pipe coupling

PIPE SLEEVES through tunnel roof were accurately located under machines.



TUNNEL NETWORK was carefully planned to fit present and future paper-cup production requirements. Width of tunnels was determined by number of services carried.

cu ft. Including excavation, walls, floors and I-beams, they cost about 56 cents per cu ft, a total of $225,000. An estimated 300 tons of structural steel was saved by not hanging service lines from the framework, or about $90,000. The mechanical contractor conservatively estimated that he reduced labor costs by 15% because of the tunnels, since pipe was simply lowered a short distance into place rather than hoisted up to the ceiling. He saved 5% on materials because all ceilings to machine runs were eliminated. His total savings came to $35,000. The electrical contractor figured he too would have spent an extra $35,000 if it weren't for the simplified working conditions in the tunnels.

Some quick addition reveals that first cost of the tunnels is only $65,000 more than if services were catried in the roof framework. Based on five years experience in Augusta, Lily-Tulip is confident that maintenance savings over a 20-year period will total ten times the first cost of the tunnels.

• **Cavity walls**—This type of wall construction was employed to reduce required air-conditioning capacity and to obtain better protection against driving rains. The wall consists of 4-in. brick on the outside, a 1½-in. air space and 4-in. terra cotta tile on the inside. Going from floor level to roof, there is a 10-in. thick 4-ft high foundation wall, 9 ft of cavity wall, a 1-ft concrete sill, 5 ft of corrugated wire glass, and 6 ft more of cavity wall. The sections are free standing, being tied to the steel columns. Expansion joints are spaced every 200 ft, formed with double H steel columns with aluminum facing.

An unusual feature is the short strip of window located so high in the wall, about 13 ft from floor level. Of course, a wall with less window is cheaper to build, and to have a large expanse of glass would more or less defeat the purpose of cavity-wall construction regarding heat transmission. More than 33,000 sq ft of aluminum trim corrugated wire glass windows admit daylight to the plant interior.

Lily-Tulip officials believe it is not a bad decision to use walls with small windows since the large majority of workers are located in the interior of the plant anyway, and from there do not feel particularly more comfortable with large windows placed at eye level. In addition, night shift workers who

BUILDER PROFITS BY OTHER ADVANCED METHODS

P. Kretzer & Son couldn't employ its entire bag of money-saving methods in Lily-Tulip's Springfield facility. But William Kretzer, president of the industrial construction firm, speaks convincingly of his organization's success with (1) laying floors with a road paver and before any steel is erected, (2) tilt-up wall construction, and (3) use of asphaltic concrete floors in warehouse areas.

Placing the floor of a one-story building before any structure is up has many advantages, few disadvantages. Foremost, it allows use of speedy road paving machinery. The resulting smooth and firm surface is a great aid in later stages of construction, especially where much rolling equipment is to be used. It also eliminates the "big muddies" that can develop after a heavy rain.

• **Convinces owner**—One quite subtle advantage of this system concerns its effect on the owner. During the course of construction much heavy equipment rolls over the floor, thereby proving the floor sound. In addition, any settlement or other defect is detected before the project is complete and can be repaired before the builder leaves the job. As employed on a number of Kretzer jobs, the floor-laying procedure is as follows: Each day a 25-ft wide strip of concrete is paved the length of the plant (800 ft or more). About 4 hr are required for laying, 10 hr for finishing. Strips are laid checkerboard fashion and have expansion joints every 200 ft. For curing, sand is applied and kept wet. Later the sand is swept aside and used for rough concrete work such as walks.

Column bases are located in the middle of a strip. Anchor bolts and billet plates are set 8 in. below finished floor level. This 8 in. is temporarily filled with sand in forms until after the paving operation. Then the sand is scooped out and billet plates are clearly exposed.

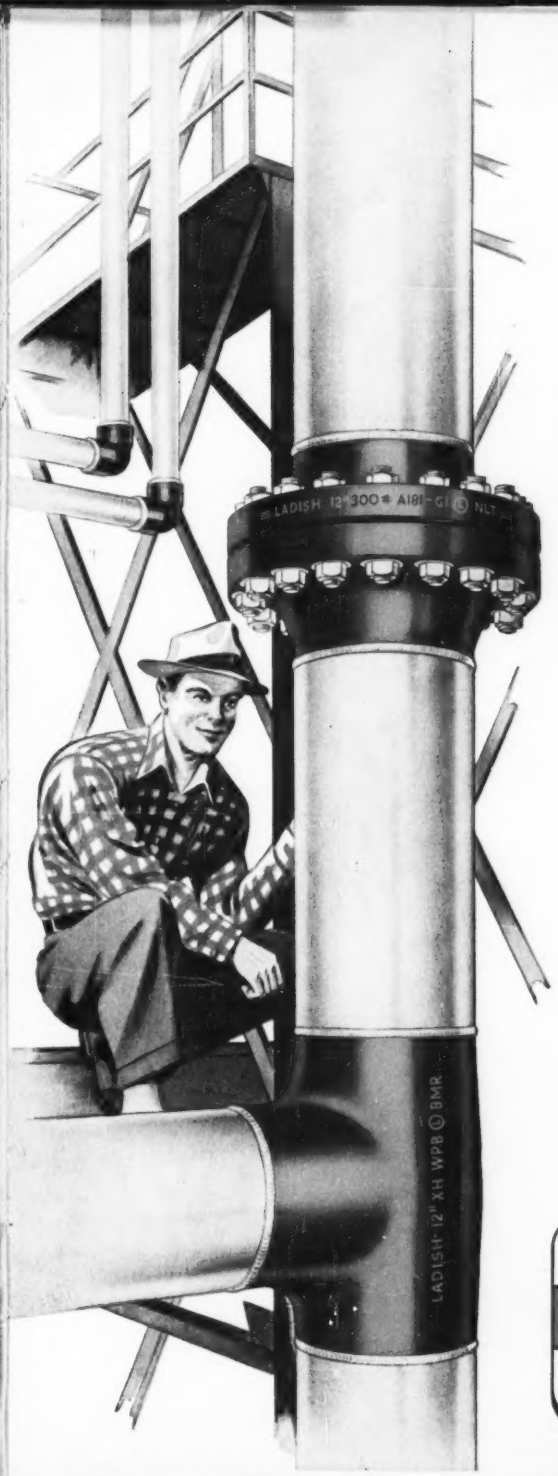
• **Tilt-up walls**—The perimeter strip of a floor laid at this time and in this manner can be used advantageously as a bottom form for a tilt-up wall. Machine finishing prepares a surface which is almost as good as a regular casting bed.

Kretzer reports on a 183,000-sq ft warehouse in Fayetteville, Tenn., for General Shoe Corp., completed in 1951 at a cost of $4.50 per sq ft. Tilt-up walls, 6 in. thick and 8 ft high, cost 85 cents per sq ft in place. They were cast in 30-ft long panels and tilted into place with a strongback. Incidentally, this job was completed in 120 days.

• **Asphalt floors**—The firm has built a number of warehouses in the last three years with asphaltic concrete floors. First costs have run consistently 30 to 40% less than concrete, some of this due to speedier laying. Thus far, cost of maintaining the floors has been such that all the owners are quite satisfied with asphaltic concrete.

The normal heavy-duty floor, designed for a 2,000-psf load, consists of 4 in. of penetration macadam, 1½ in. of binder, and ¾ in. of sheet asphalt topped with cement grit. Broken stone of 1½-in. maximum size is penetrated with 1½ gal per sq yd of liquid asphalt. The binder and surface courses are compacted with 10-ton rollers.

This type of floor also lends itself to laying before steel is up. If this is done, all but the finish course is put down.



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cannot gain comfort advantages from windows anyway are not discriminated against.

The contractor estimated cost of the cavity wall to be only 10 cents per sq ft more than solid masonry construction of the same thickness. About 30,000 sq ft of wall was built for $1.25 per sq ft. An estimate by the air-conditioning designer put the reduction in plant due to lower U factor of the cavity wall and minimum window area at 50 tons, whose installation worth is valued at $600 a ton.

• **Large bays**—Steel was erected coincidently with the walls. Since the only overhead services are heating and air conditioning ductwork and lighting fixtures, and the total roof design load only 50 psf, the framework is exceedingly light. Eight-inch wide flange columns are set on 30x50-ft centers. Girders, 5-ft deep trusses weighing only 2,000 lb, span the long dimension. Wind bracing is provided by 5-ft deep trusses spanning 30 ft between columns. Open web steel joists, 16 in. deep, are set on 5-ft centers between the girders. Steel tees for carrying the gypsum roof are spaced every 32 in. across the joists.

The plant's rail siding, completed during early stages of the job, was utilized to bring the steel in. Truck cranes employed for erection handled sections directly from the cars.

• **Pumped roof**—The roof consists of 1-in. glass fiber insulation below 2½ in. of poured gypsum, which in turn is topped with ½ in. of built-up roofing and slag. Its U factor is 0.15. Over the manufacturing area is a so-called "April showers" spray system designed to hold roof temperature at 95 F when otherwise it would approach 150 F. The system operates intermittently, by thermostatic control, just to maintain a film of water which cools the roof by evaporation.

The insulation board was placed between tees and served as forms for the slab mix, which is composed of 87% gypsum and 13% wood chips. A thin layer of this mix was first placed over the glass-fiber forms to stiffen them. Then the rest of the mix was delivered 25 ft up to the roof by a positive displacement pump through 2-in. rubber hose. In this manner, up to 30,000 sq ft of 2½-in. slab could be placed in an 8-hr. day with 10 men, as contrasted with a production of 15,000 sq ft by 20 workers. A day after pouring, felt strips were put down with the machine applicator pictured on page 31.

The complete roof, totaling 400,000 sq ft, cost 70 cents per sq ft. An estimated 2 to 3 cents per sq ft was saved by pumping the mix rather than placing it by ordinary means. The sprinkler system cost $50,000, but it allowed the air conditioning plant to be cut by 150 tons, or about $90,000.

Floor sections of reinforced concrete were poured as the roof overhead progressed. The slab, 5 in. thick, was designed for a 250-psf live load. A nonmetallic quartz crystal hardener was embedded in the top of the floor.

• **Workers made happy**—Several novel labor relations approaches by the builder, P. Kretzer & Son, Inc, of Flushing, N. Y., were in evidence at the Springfield job. The most obvious was a public address system which gave forth with music as the workers came on the job, before they went to lunch, and at the day's end. The system was used also for news announcements and paging of various supervisors, especially useful when supplies were being delivered.

Candy, cigarette and drink dispensing machines were available to workers in a tastefully furnished field office. A youngster with a canvas of ice water (with paper cup dispenser, of course) constantly circulated about the site. Good toilet facilities were not neglected.

Moving pictures were taken of every phase of the job, with particular emphasis on the workers themselves. They were shown at a gala (beer and barbecue) party which Kretzer threw for workers, their families, Lily-Tulip officials and local civic leaders at about the three-quarter point of the project.

• **Credits**—The Kretzer firm designed and built the plant, employing Hurley & Hughes and Charles Lobejager of New York City as architects. Chief subcontractors were: McClean Construction Co., Springfield, Mo.—grading and excavation; Johnson Construction Co., Springfield—concrete and masonry; Calvert Iron Works, Inc., Atlanta, Ga.—steel; Anning Johnson Co., Chicago—roof; Abbott, Lester & Co., New York City—mechanical; Denino Electric Co., Long Island City, N. Y. and Damiron Electric Co., Springfield—electrical.

Harlan L. Carroll, vice-president of manufacturing for Lily-Tulip Cup Corp., was in charge of the job for his firm.

Helicopter landing strips open new construction field

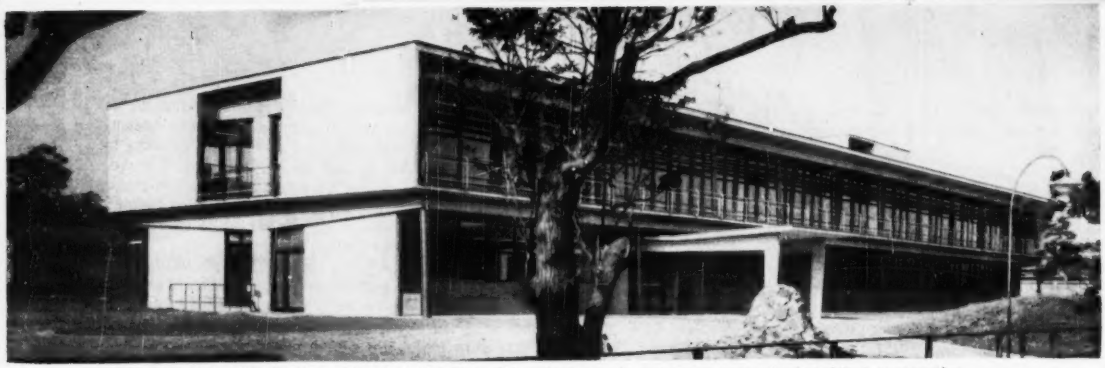
HELIPORT landing strip like this for Bell Aircraft Corp., Fort Worth, Tex., can be constructed for under $20,000, exclusive of buildings, towers, and equipment.

Landing strips for helicopters are relatively simple, according to Wigton-Abbott Corp., engineers and constructors of Plainfield, N. J.

Wigton-Abbott cites the recently completed helicopter plant and adjoining heliport near Fort Worth, Tex., for which they were designers and cobuilders (with Tellepsen Construction Co., Inc., Houston, Tex.).

Completed last spring, the heliport is simply a 200 x 400 ft rectangle, with two hardstands having sunken concrete blocks with metal rings for tying down the helicopters.

Since impact loads are not great, and no heavy traffic is anticipated, only 9 in. of asphalt paving is used. The firm estimates that a similar heliport might be constructed for under $20,000, exclusive, of course, of hangars.



RIGID-FRAME BUILDING for Reader's Digest in Tokyo is center of controversy over seismic-resistant construction.

Scientists shake building in seismic test

". . . The first thing I thought when I saw the Reader's Digest Building in Tokyo was, 'It would be fun to shake it'." So wrote engineer Kenzaburo Takeyama in an article, "The Building That Tempts Me to Shake," published in Japan. He went on:

"From the shape of the building—looks like it's standing on one leg—I was immediately reminded of the simplest vibration body, consisting of a pole with a black ball on its top end, which I learned at the first lesson of seismic-proof construction."

• **Mistaken identity**—In the text that followed, he expressed doubt as to the seismic resistance of the office building, which had been completed recently. Nor was he the only Japanese engineer to criticize the American-designed structure. These criticisms, however, appear to have been based on a number of misconceptions regarding the structural framing. The critics assumed, for example, that the girders in the transverse section—the narrow direction—are cantilevers, projecting from opposite sides of a central row of columns.

This is not the case. To dispel such doubts of the structure's ability to resist earthquakes, scientists from two Japanese universities were engaged to test the building.

• **Rigid-frame design**—The Reader's Digest Building in Tokyo was designed by Antonin Raymond & L. L. Rado, architects-engineers, of New York City and Tokyo, and Paul Weidlinger, structural engineer, of General Engineering Associates, New York City. It is a two-story reinforced concrete structure, about 54x200 ft in plan and 25 ft high, founded on piles. It has concrete-joist floors and roof, designed for 2,500-psi concrete, and an exterior almost entirely of glass. Only the ends are walled. In the interior, movable partitions subdivide the office area.

The concrete floor and roof joists extend in the long direction of the building and are supported at 18-ft intervals on two-span continuous, reinforced concrete girders with pin-supported ends. Spans are about 27 ft.

At the interior support, each girder is integral with the column, which also is reinforced concrete. Because of the large bending moment at that support and the pin connection at the other supports, the girders are much deeper at the interior support than at the ends. It was this tapered shape, which is generally associated with cantilevers, that apparently misled observers.

The interior row of columns is braced in the long direction of the building by a 6-in. thick reinforced concrete wall. A reinforced concrete spandrel beam braces the exterior row of columns.

• **Hinged columns**—Located about 2 ft outside the windows, those columns consist of 5¼-in. O. D. steel pipe. They are encased in lightweight concrete for fire protection, and the concrete, in turn, is enclosed in a non-structural 9-in. O. D. steel pipe.

To resist transverse forces better, these columns are inclined slightly toward the interior of the building, perpendicular to the girder soffits. The slope is about ⅝ in. per foot.

Details at top and bottom of each column permit a limited amount of rotation. At the second floor, a dowel passing through the spandrel beam but not bonded to the concrete transmits the axial load from the second-story column to the support below. Its retractability made it easy to grout in the bearing plate on top of the first-story column. This bearing plate transmits the load from the second floor to the lower support. All other columns are seated on bearing dowels and sleeves.

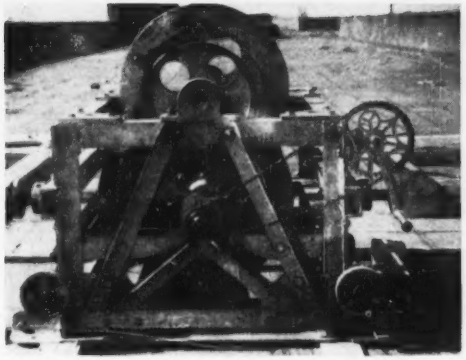
• **Engineer explains**—Mr. Weidlinger, the structural engineer, reports that the structural frame was determined by two basic considerations: (1) function of the particular plan; and (2) resistance to vertical and horizontal loads. The first indicated the desirability of obtaining unobstructed windows along the length of the building. Setting the windows back from the columns permitted transverse partitions to be installed without regard to column spacing. And constructing the outer columns of steel minimized obstruction to the view. With this particular plan, the massive interior columns are no handicap.

The need for flexibility in locating transverse partitions made it necessary that the frame resist lateral forces without the aid of walls.

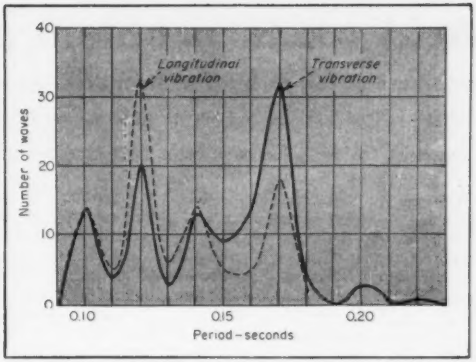
"It is obvious," Mr. Weidlinger says, "that the slender exterior columns would be able to carry only a small percentage of the lateral load, even if an attempt had been made to embed them in concrete to provide a rigid connection. In view of this, it was found more practicable to design a hinged connection between steel columns and concrete girders.

"Once this decision was made, it became clear that the moments due to vertical or horizontal loads would be absorbed by the center column, and therefore, the connection between the girders and that column had to be made heavy. The main girders were given a wedge shape; at the ends the section is sufficient to take the shear, while at the center column the section was determined by moments."

Special attention was given to the effect of seismic forces. The design was checked both with the Japanese Building Code and the Uniform Building Code of the Pacific Coast Building Officials Conference. Earthquake forces were computed in accordance with formulas used for Zone



VIBRATOR was applied to various parts of the building and vibrations measured to test the design.



MAXIMUM FREQUENCY of occurrence of vibrations in a given time determines the natural period.

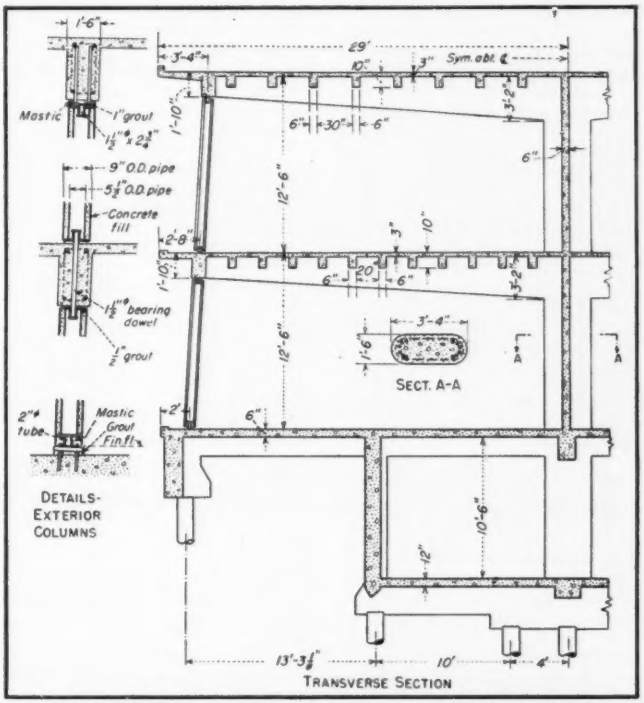
III in the U. S., which is the most violent seismic area on record. Design computations were checked by model analysis.

• **Building passes vibration test**—In view of the doubt expressed by Japanese engineers as to the ability of the structure to withstand earthquakes, Prof. Tachu Naito, of the engineering staff of Waseda University, and Prof. Shinji Nasu, of the physics department of Tokyo University, were requested to make a vibration test on the structure.

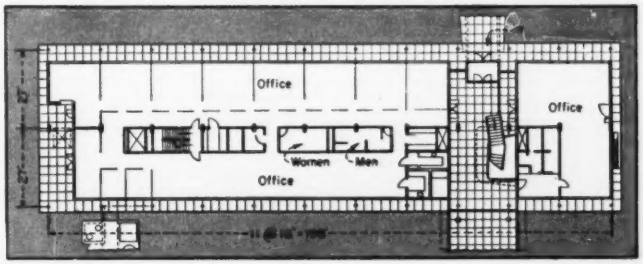
The scientists measured the natural period of the building with a centrifugal force agitator, response to vibrations being recorded by a seismograph. They made tests in transverse and longitudinal directions.

The tests indicated that the fundamental periods of vibration of the building in both directions are much shorter than those of other two-story buildings of about the same dimensions. The measured period in the transverse direction was 0.18 sec and in the longitudinal direction, 0.12 sec. Ordinary buildings have periods of more than 0.2 sec. transversely and 0.17 sec. longitudinally, the scientists say. Further, the Reader's Digest Building appears to have large damping ratios—1.70:1 in the transverse direction, 2.11:1, in the longitudinal direction.

These values, the scientists conclude, are more favorable than those found in comparable buildings and suggest that the building may be safe in severe earthquakes, because the response to earthquake motion would be comparatively slight, and the vibration would be damped quickly.



TAPERED GIRDERS, continuous over two spans, support joist floors and roof.



FLOOR PLAN provides office space around the perimeter, where windows are continuous. Large interior columns are not objectionable.

Acid waste problem put into perspective

- **Measure of the problem of steel pickling wastes**
- **Methods of treatment—advantages of each**
- **Market for by-products held not too promising**

TWENTY-ONE PERCENT of all steel produced is pickled—immersed in acid, usually sulfuric—for removal of oxide scale before processing. A depleted acid containing dissolved scale and metal results. And this worked-out fluid—spent sulfate pickling solution—is an industrial waste problem of prime magnitude throughout the steel industry.

So that all known data on the problem might be available to the industry for handy reference, and so that sanitary engineers charged with responsibility for pollution abatement might also have the benefit of these data, a manual was published last month by the Ohio River Valley Water Sanitation Commission, through its Steel Industry Action Committee.

As set forth and detailed in the manual, characteristics of the steel pickling wastes are these: Waste solution from batch pickling may be 0.5 to 2% free acid and 15 to 22% ferrous sulfate; waste liquor from a continuous pickling process ranges 5 to 8% free acid and 14% to 16% ferrous sulfate. Over 600 million gallons of such waste must be disposed of yearly. By-product recovery is possible by many processes, but practicable to a very limited extent. Only copperas is being extracted commercially, and this is only on a small scale.

• **Disposal to sewers**—Before going into available methods of treating pickle liquor, the manual discusses possibilities and problems of discharging the waste to sewers.

Ferrous sulfate might be welcomed at the sewage treatment plant. It is useful as a coagulant to aid sedimentation. But free acid would not be wanted. Naturally alkaline sewage is not alkaline enough to neutralize more than a small amount of acid in the pickle liquor. Costly soda ash has to be added to the waste; waste should be stored in holding tanks for constant discharge to the sewers. At best, sludge volume is increased at the sewage works, and air diffusers at activated sludge plants are apt to be clogged.

It is up to the steel industry and the municipality in each individual case to explore the effect and the cost before deciding to discharge pickle liquor to sanitary sewers. In some instances it will be advisable; in others it will not be.

• **Treatment is neutralization**—Alkaline materials to neutralize free acid and precipitate iron form the most widely used treatment of spent sulphate pickling solutions. Lime treatment is costly. Resultant sludge occupies almost as much volume as the original liquor plus lime slurry. Lagoon space for draining and drying this sludge is considerable. Cost of lime neutralization can fall anywhere between $10 and $20 per ton of acid used in the picklers.

Efficient treatment, described in principle below, can keep operating expense of neutralization down. Construction expense will vary with local factors. Two tanks in parallel are recommended to reduce down-time; tanks must be acid-proofed and have 3 to 6-ft freeboard. One or two lime slaking and storage tanks are needed, complete with agitators and some discharge measurement device.

In treatment, a batch of liquor, preferably hot, goes from storage or the pickler to the neutralization tank for vigorous mixture with the right volume of milk of lime. Sludge formed goes to storage lagoons where it dries to a plastic mass. A sump, dredged periodically, will do where lagoon space is limited. In built-up areas sludge disposal can become a costly charge of transportation by tank-car or pipeline to disposal areas some distance away.

Here are the important features to remember about the few leading treatment methods:

• **High calcium lime**—Slaked quicklime or, for small installations, maybe a slurry of hydrated lime is used, mixing 15 to 30 minutes. There are no real problems of design or operation as long as there is adequate liquor storage space for averaging the waste's composition.

• **Dolomitic lime**—This neutralizer is less reactive but has higher basicity (available alkalinity) than high calcium lime. If its full basicity is to be utilized without unduly prolonging the process, steps must be taken. The treatment can be kept to an hour if 5% excess of the alkaline agent is used; liquor is treated hot; diffused air is introduced. Dolomitic lime produces a bulkier sludge than high calcium, but its basicity advantage cancels out that nuisance factor.

• **Air oxidation**—Controlled oxidation of pickling liquor after neutralization changes ferrous hydrate to ferrosoferric oxide. Oxidation is by aeration at a temperature above 75 C. The method is new and its principal advantage is reduced sludge volume—a factor to consider where lagoon space is limited.

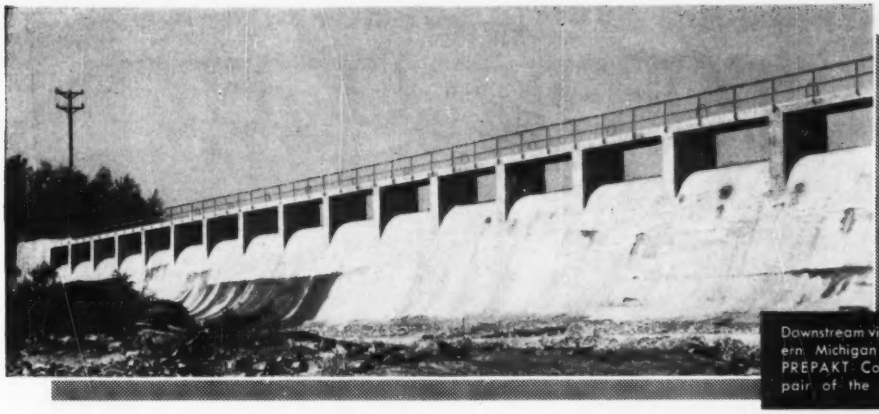
• **Limestone**—Pulverized limestone, relatively cheap and generally available, can be used dry—thereby requiring no slaking tanks. And it produces a less voluminous sludge than does lime. Longer reaction time can be lessened by aeration; and aeration also will help precipitate ferrous sulfate if oxidation is allowed to go to completion. Ordinarily, limestone will not precipitate ferrous iron completely because limestone cannot produce the required pH of 9.3. Economy of purchase in bulk and simplicity of handling are in favor of the limestone neutralization method.

• **Other processes and possibilities**—Processes: (1) Pulverized limestone plus quicklime can cut the reaction time of limestone alone. (2) Dry lime use is applicable in small plants where a required excess of neutralizer is not too great an absolute value; this method has the advantage of a granular sludge that will dewater on a vacuum filter. (3) One steel company pours the liquor on molten slag just dumped for disposal. Some 20,000 gal can be vaporized completely in under an hour in this way—without air pollution, it is claimed.

Possibilities: By-products are possible but not yet practicable; 5% of the pickle-liquor output of the steel industry would satisfy all present demand for copperas, the major by-product.

Other readily recoverable products not yet commercially worth the effort number by the dozen and include even a construction material—a plasterboard, similar to some available gypsum products.

• **Credits**—Orsanco's manual (which is available at $2) was prepared by R. D. Hoak. He is on a stream pollution fellowship at Mellon Institute, Pittsburgh, sponsored by the American Iron and Steel Institute. AISI assisted with Hoak's services on request from Orsanco's Steel Industry Action Committee. T. F. Reed of U.S. Steel heads the subcommittee responsible for the manual, and John E. Kinney of Orsanco's engineering staff sparked its preparation and production.



Downstream view of Northern Michigan dam after PREPAKT Concrete repair of the gate piers.

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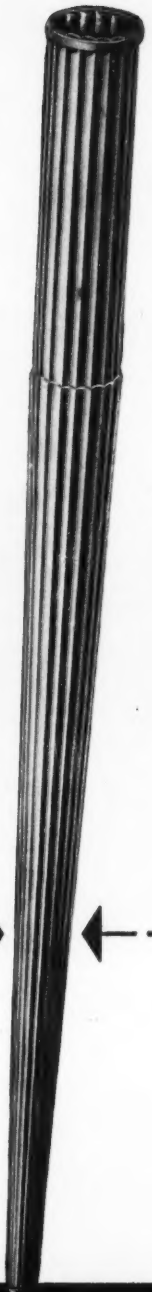

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Border-line toll roads have possibilities

• Supplemental ways for financing them could provide a means for speeding construction of much needed additions to the nation's highway network

Farley Gannett
Gannett Fleming Corddry and Carpenter, Inc., Engineers
Harrisburg, Pa.

THE TOLL ROAD, which offers an opportunity for financing primary highways by the issuance of revenue bonds, is assuming a more and more important position in the development of the highway system of the United States. With Maine, New Hampshire, New York, New Jersey, Colorado and Pennsylvania now operating such roads, and Oklahoma, Ohio and West Virginia having financed and put toll roads under construction, there is real progress being made in toll road use as a method of financing road construction. The New York Thruway, which is now under construction, will be a modified toll highway as will be the New Jersey Garden State Parkway also.

In addition to these, Virginia, North Carolina, Florida, Texas, Missouri, Iowa, Massachusetts, Indiana, and Georgia, and probably other states, are considering the use of this method of financing primary highways. In all the United States over 750 miles of toll road have been built and are in operation; nearly 1,200 more miles are under construction. As a result of building these roads, first-class highways are rapidly built and added to the highway system, and thus wear and tear and congestion on other roads are reduced. The Secretary of Highways of the Commonwealth of Pennsylvania said not long ago: "Thank God for the Pennsylvania Turnpike".

• Best routes picked first—The best toll road locations are being picked first, so that in some of the later projects studied the traffic will be leaner compared with construction cost per mile, and border-line roads will come up for consideration.

Undoubtedly some roads may be proposed which, on the face of the facts available, do not indicate that they are financially possible. A good many situations will be found, and more and more will be disclosed, where in the early years, the traffic which would use a toll road in preference to a free state highway would not be sufficient to maintain and to pay the interest and debt amortization on the construction of a new toll road. Consequently, some means of assisting in situations like these will have to be resorted to if the road is to be built.

• Financing border-line roads—Ways of financing these border-line roads is a matter well worthy of consideration. By means of such roads traffic will be facilitated and other roads will be relieved of it, and a state's credit will be saved for other purposes.

Records show that once such a road is built, traffic begins to use it and increases from year to year, sometimes rapidly, other times more slowly, as more local and out of state travellers find out about its advantages.

In a few cases some such measures have been used, the most noteworthy being the New York Thruway, where the state credit will be behind the proposed bond issue only to the extent that it is needed beyond the money coming from tolls. It is expected that the bonds to build this road, with the state credit behind them, probably will sell with a less than 2% coupon.

In Oklahoma, where the Oklahoma City-Tulsa road of about 100 miles indicated that the cost would be too high to warrant the sale of revenue bonds, an arrangement was made by which the state is paying for 10 to 12 miles of the road, and the balance of about 90 miles will be a self-liquidating toll highway. This put the road on a financially feasible basis and it is now nearing completion.

• Aid from the U. S. Government—There are other means of assisting in the financing of these border-line roads which occur to one who is interested in seeing an extension of this tremendous movement of toll-road construction. The state of Pennsylvania resorted to one method when the original 160 miles of its turnpike were built during the depression. The federal government contributed about $30,000,000 toward the cost and the Reconstruction Finance Corporation purchased bonds to cover the balance. These 4%-bonds were later refunded and purchased by banking houses and are now down to a 2¼% coupon and selling well above par, owing to the successful operation of this road.

Now that the depression is over, however, there is no money available from the federal government for this sort of thing.

• Stage construction—Another method, the one which is being used in West Virginia to work out a border-line toll road proposition, is to build a two-lane road at first, with additional climbing lanes on all steep grades, with the plan in mind of adding two lanes later when traffic conditions warrant it.

This road was planned at the start as a 200-mile, four-lane proposition and was gradually changed to a 90-mile, two-lane road, which change was necessary in order to make it financeable. This undoubtedly will make the highway more expensive in the end but will enable the state to have at least a 90-mile toll road promptly.

To a certain extent the West Virginia road is similar to the original Pennsylvania Turnpike, in that it crosses a mountainous, sparsely inhabited stretch of the state and connects the two extremities, Charleston to the north and Princeton to the south, with a road some 40 miles shorter than existing roads. It will have low grades and good alignment compared with existing routes between these two cities, thus saving time.

• Use of authority financing—In Pennsylvania an unusual method is being used by the state for financing primary highways. This is through the use of a General State Authority which has the right, through legislative statute, to issue bonds for construction purposes and to rent the facility so built to the state for enough to pay the interest and retire the bonds.

This method is being used for the construction of hospitals and other state institutions, as well as for the construction of primary highways and flood-control dams. In this way over 50 miles of highways have been or are being built in Pennsylvania and these bonds are readily marketable through investment banking syndicates at less 2% coupon. A part of a border-line toll road might be built by this means.

• Partial backing for bonds—In the case of the Denver-Boulder Turnpike in Colorado a novel scheme was used to make possible the financing of a border-line road. The engineers' report indicated that this road, 17.3 miles long, costing $6,000,000, would lack about $86,000 per year of paying annual expenses. To take care of this gap, a bill was enacted by the legislature providing that state highway funds could be used up to 30% of

the annual cost of operating the road.

Up to Aug. 31, the end of the operating year, the toll collections amounted to $236,844, of which only $92,934 was required for interest payments. Since then, $29,000 in bonds have been redeemed. The toll is about 1.5¢ per mile.

Nine miles of the total distance between Denver and Boulder is over highways built with regular highway department funds. The most important of these is the 2.4-mile link connecting the turnpike with the Denver Valley Highway, which extends into the heart of Denver. It cost $600,000.

• **Full state support**—The Garden State Parkway, which was undertaken recently by New Jersey, now will have full state backing for its bonds. It will parallel the Atlantic seacoast from a point at or near the New York State line to Cape May at the southern end of the state, a distance of 180 miles. Its cost is estimated at $285 million.

Some 15 miles have been completed and about as much more is under construction, using regular State Highway Department funds and some federal-aid money. At the November election, full state credit was voted for revenue bonds to be issued by the New Jersey Highway Authority, which was created by the legislature earlier in the year to complete the parkway as a toll project. (Some parts of the parkway are to be free of tolls.)

• **Private ownership**—There has been some talk of private corporations building toll roads, as was the practice in this country a hundred years or more ago, and as has been a fairly recent practice in building toll bridges. However, the coupon rate on bonds for such projects is so high as to make that method costly to finance, build and operate a highway.

Several privately financed toll roads have been proposed and one or two have been incorporated, but as yet none has been financed.

Furthermore, the corporation building such a highway would have to have the right of eminent domain and would have to be incorporated with the approval of the state legislature, which might be difficult to obtain. Bonds of such corporations would not be tax-free and the corporation would have to pay income taxes. In such a case a considerable amount of equity money would be necessary.

• **Federal participation**—There has been some discussion of the participation of the federal government through the Bureau of Public Roads in toll roads, but this is not looked upon with favor by that bureau nor by some states.

Such a method, involving government participation to only a minor extent, say 20 to 25 percent, might make a road which otherwise might not be profitable, for the first 10 or 15 years anyway—a feasible, reimbursable project, as experience teaches the highway users the advantages of such a road. The government could be reimbursed for its share, after the first mortgage bondholders have been paid back.

• **One project turned down**—The engineers who were retained to report on the cost of and probable traffic on a proposed toll road between Atlanta, Ga., and Chattanooga, Tenn., have reported unfavorably. This was to have been a 75-mile road, starting at the north end of a four-lane road recently built by the state and extending some 40 miles northwardly from Atlanta toward the Tennessee line.

Here is a road that apparently is on or below the border line and if assisted in some way might be made to pay. If this road would be an aid to important traffic between these two points perhaps the State Highway Department could build a section at the northern end, as it has at the southern end, and so cut down the cost without reducing the traffic. Maybe part of it could be two-lane at first.

• **Second-mortgage bonds**—A possibility for aiding such a road might be the purchase by large trucking companies of second-mortgage bonds with interest and amortization only when earned after first-mortgage charges. This is just a suggestion but it might work out in some cases. The auto-hire companies and the oil and gas companies as well as the automobile manufacturing companies, being deeply interested in good roads, might also buy second-mortgage bonds.

If a state legislature provides in its turnpike legislation an appropriation of say not over 20% of the cost, to be paid back, if earned, a border-line road might be made feasible.

In all cases, these toll roads would revert to the state when the bonds are paid off, so it wouldn't be asking too much for the legislature to help out a little at the start when eventually the state would own the road free of debt.

• **Higher tolls possible**—The toll roads which have been built have pretty well set a toll-rate pattern of 1¢ to 1½¢ a mile for passenger cars, except on part of the New Jersey Turnpike where higher rates are charged. Possibly, higher rates could be charged in other cases to make a border-line road pay out.

In Maine, when rates were raised, no reduction of traffic resulted. We do not know yet what the traffic might bear.

The toll that trucks would pay can be computed pretty accurately as this is largely a matter of savings in dollars and cents; but passenger car fares are not always based on actual savings in gas, oil and time, as the matter of safety and comfort and time saved have a good deal to do with whether or not a driver will use a toll road.

On the Pennsylvania Turnpike of 327 miles, the annual rate of gasoline sale is about 25 million gallons. The Pennsylvania State tax on gasoline is 5¢ per gallon. This would amount to $1,250,000 per year at the present rate. If this tax on gasoline actually sold along the turnpike were returned to the Turnpike Commission, it would add 8% to its revenues.

The Pennsylvania Turnpike doesn't need this money, but if this plan could be applied to border-line turnpikes it might be just what would be needed to make some of them feasible. This gasoline-tax payment could be stopped when the toll road became self-supporting without it.

• **Haphazard route selection**—Of course, the one objection that can be raised to what might become a haphazard method of building toll roads, is that their location might not be the best for a transcontinental or interstate highway, either east and west or north and south.

One answer to that is that each

TOLL HIGHWAYS

Toll Roads in Service	Length (Miles)
Pennsylvania Turnpike	327
Westchester County Parkways (N.Y.)	25
Connecticut Parkways	67
Maine Turnpike	44
New Hampshire Turnpike	15
New Jersey Turnpike	118
Denver-Boulder Turnpike	17
Overseas Highway (Florida)	122
Buccaneer Trail (Florida)	17
	752
Toll Roads under Construction	
New York State Thruway	535
Turner Turnpike (Oklahoma)	88
West Virginia Turnpike	88
Garden State Parkway (New Jersey)	180
Penn.-N.J. Turnpike Connection	39
Ohio Turnpike	241
	1,171

new toll road, when projected, has in mind picking up the traffic from existing toll roads and carrying it across its own state. Thus the Ohio Turnpike counts on picking up the traffic from the western end of the Pennsylvania Turnpike, and carrying it on across that state, and the proposed Indiana road is planned to join the western end of the Ohio Turnpike and carry the traffic from there on across the state of Indiana.

Similarly, now that the West Virginia Turnpike is a financed project under design and construction, Virginia is considering a road to connect at the southern end of the West Virginia Turnpike and to carry it across that state, and North Carolina has under consideration a toll road to carry the traffic from the southern end of the Virginia road, southwardly across North Carolina. These roads, because of the necessity of picking up profitable traffic from other toll roads eventually will be an interconnecting system. Thus roads not financially practicable by themselves become possible due to the traffic fed to them by other turnpikes when built.

• **Savings through line revision**—Sometimes it may be possible to revise the location of a toll road that seems to be border-line and thus reduce the cost or perhaps pick up additional traffic. A revision of this sort was made on the Oklahoma Turnpike. It often occurs that when actual design starts, revisions in location and grades may seem necessary, which sometimes reduce the cost and sometimes increase it.

More careful study of the preliminary location often will result in location changes, and more thorough study of traffic may result in changes in estimated revenue. These preliminary reports usually are rush jobs and they often are done at small cost in order to get the job under way. This is not good practice from any standpoint but the trouble is that usually the turnpike authority has no money of its own, and has to borrow from the highway department for these reports and tries to make these loans as small as possible and thus cannot pay for a thorough investigation. Money invested in preliminary studies generally is well spent.

Toll roads are far more popular than a few years ago. The public, the truckers and most state governments want them—even the federal government, formerly definitely antagonistic, is only mildly opposed now. We should be careful not to push these roads too hard as it will take only one definite failure to give them a black eye in banking circles and in popular esteem.

More emphasis on practical experience proposed for teachers by examiners

A resolution designed to encourage engineering teachers to obtain more practical experience in engineering work other than teaching, which was adopted at the annual meeting of the National Council of State Boards of Engineering Examiners, now is being circulated to the principal engineering societies and engineering schools. It also has been submitted to the Engineers' Council for Professional Development for consideration as the basis for changes in the model registration law for engineers.

The resolution, which was adopted without a dissenting vote although some objections to it were raised in the discussion that preceded the vote, is given below. It was prepared by a committee consisting of R. A. Seaton, dean emeritus, Kansas State College; Thomas C. Shedd, professor of structural engineering, University of Illinois; B. J. Robertson, professor of mechanical engineering, University of Minnesota; Francis L. Castleman, Jr., dean of engineering, University of Connecticut. The resolution:

"Whereas, engineering is a constructive profession that utilizes basic knowledge of the properties of materials and an understanding of the principles underlying physical and chemical phenomena, together with a continuing flow of new scientific discoveries, for the design, construction, and operation of useful machines, structures, processes, factories and products to meet the economic, social, and spiritual needs of human society; and

"Whereas, academic study and instruction must be supplemented by some years of non-academic postgraduate experience under the supervision and guidance of able professional practitioners for rapid development of professional competence in engineering; and

"Whereas, it is deemed of great importance that engineering college staff members who teach professional engineering courses shall, themselves, be competent to practice professional engineering in the fields of their courses of instruction, in order to stimulate and vitalize their teaching and to inspire the respect and confidence of their students; be it therefore

"Resolved, that the National Council of State Boards of Engineering Examiners assembled in its thirty-first annual convention this sixth day of September, 1952, recommends:

"(a) That State Boards of Engineering Examiners, in evaluating qualifications of applicants for registration or license as professional engineers, shall require that at least one year of the qualifying engineering experience shall have been in some other area than advanced study, teaching, or research in a college or university, and shall have been under the direction of a registered or licensed professional engineer; and

"(b) That administrative officers concerned with engineering instruction in colleges and universities shall require that staff members who teach professional engineering courses be, or be under the direct supervision of, registered or licensed professional engineers who have had at least one year of suitable engineering experience after graduation, in some other area than advanced study, teaching, or research in a college university; and that such engineering experience shall be given equal recognition in respect to advancement in rank and salary year for year up to at least two years, to the recognition given for graduate study leading toward an advanced degree."

During the discussion a few speakers said that while some state boards would be able to require engineering teachers applying for license to have at least one year of design or construction experience, other boards would not as their laws specifically state that teaching experience of sufficient grade shall be accepted.

Dean James H. Sams of Clemson College questioned the inclusion of the second paragraph of the resolution as being outside of the field of engineering examiners. He said he did not think that the council should tell the deans of engineering schools how to run their business.

In explanation of why that paragraph was included, Dean Seaton said that it was included to emphasize to the heads of colleges who are not engineers the fact that practical experience for an engineering teacher is just as important as graduate study.

"In engineering," said Dean Seaton, "the practical engineering experience of an appropriate character under appropriate supervision is fully as important as advanced study, and some of it is absolutely essential if a teacher is going to do a good job of teaching professional engineering courses."

Along the same line, Carl L. Svensen, secretary of the Texas State Board of Registration, said that young engineering teachers now are on the spot: the schools want them to work for advanced degrees, but the registration boards want outside experience.

New $2,000,000 East River Pedestrian Bridge provides access from East 103rd Street, Manhattan, to Wards Island, New York.

City of New York, owner; Hardesty, Hanover, Ammann & Whitney, consulting engineers; Johnson Electric Co., electrical contractor; American Bridge, fabricator-erector.

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A finger-tip speed control system plays a vital role on the Department of Public Works' new East River Pedestrian Bridge. Connecting East 103rd Street, Manhattan, to Wards Island, New York, this installation features a 312-ft. girder lift span—longest in the world.

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Westchester gets ninth large firm in new offices-to-suburbs trend

The recent announcement that the Allstate Insurance Co. will locate executive offices in Westchester County, N. Y., indicates that the decentralization trend to the suburbs of New York City is gaining, rather than losing, momentum.

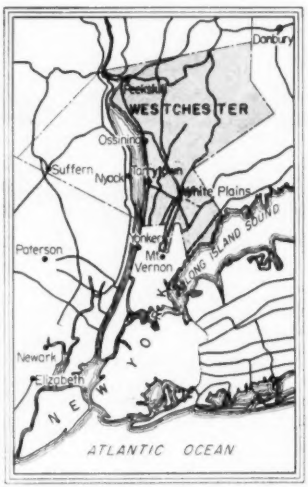
Allstate, a Sears Roebuck subsidiary operating in all 48 states, is the ninth large corporation to announce a move northward to Westchester in the last two years. Westchester public officials, torn between pride and doubt, are concerned over the impact of the trend on taxes, housing, transportation, and the obvious necessity of expansion of municipal services. Their problem is similar to that of many other suburban counties near New York City.

General Foods started the latest parade to Westchester by purchasing a 48-acre tract on the outskirts of White Plains in 1950, where its $5-million executive office building is now under construction. Shortly before, Associated Reciprocal Exchanges and Improved Risk Mutuals had set the pattern for a movement of insurance firms to Westchester; ARE to Port Chester and IRM to White Plains. Within a few months, Time, Inc., acquired a five-acre office site in Port Chester adjoining the insurance building.

The trend was further confirmed early this year when Union Carbide and Carbon purchased 286 acres in the towns of Greenburgh and Mount Pleasant for a $17-million group of executive offices and laboratories. Later, General Electric acquired 186 acres in Mount Pleasant, five miles from UC&C, on a former airfield on a high plateau overlooking Kensico Reservoir.

Others moving to Westchester include: American Telephone and Telegraph Co., which broke ground last week for an $8-million long lines switching and relay center in White Plains; The Nestle Co., now occupying two rented office buildings in White Plains until it builds its own executive offices near the General Foods group; the Picker X-Ray Corp., one of the largest of its kind in the world, now located in White Plains; Standard Vacuum Oil Co., which has bought a 25-acre site in the Town of Rye; and now Allstate.

Allstate will build in the Town of Harrison, near White Plains, on the former Ogden Reid estate. A development corporation which has purchased 200 acres in the area, and resold eight acres to Allstate, expects to dispose of the balance of the tract to other large corporations. The total development is expected to run to $30 million.



These corporations, and literally hundreds of smaller firms, are going into Westchester in a steady stream, and already established firms are at the same time undertaking large expansion programs.

• **Hopes and fears**—Some public officials think the advantages which drew the firms to Westchester—parkways and parks, good rail transportation, high-rated schools, the whole picture of country or at least suburban living, will be lost. They fear the parkways will be clogged, the railroads congested, the schools overcrowded, the country become a city, and, most alarming of all—that taxes will rise to astronomical peaks.

Others hail the trend, comparing Westchester with Nassau County on Long Island where the major development is housing and where the tremendous population growth has inundated the school system and municipal facilities. The Westchester growth, they argue, is adding millions of dollars to the tax rolls without adding much to school costs. Instead they say, the increased assessments will help pay for new schools required by the normal population growth.

The Westchester County Planning Commission is making studies and attempting to guide the growth of the new trend. The Westchester County Association, composed of representatives of leading business firms in the county, is making an impact study which will be completed next June. This study is being directed by Hugh R. Pomeroy, County Planning Director. It will attempt to assess the effect on communities of various types of developments, including executive offices, shopping centers, low-rent housing, parkways and throughways.

• **Housing and zoning**—The problem of providing low priced homes or homes at modest rentals for moderate-salaried employees of the large corporations will be one of the most difficult to solve, it is agreed. Frank P. Tufaro of Hartsdale, president of the New York State Association of Home Builders, estimated that three out of four newcomers will require homes or apartments renting for less than $100 a month, or homes that can be bought at $12,000 to $18,000.

When zoning regulations call for large building lots, it is impossible to provide housing within the low price range, Tufaro says, and he is concerned over a trend in the rural towns to increase minimum lot sizes. The Town of Bedford has a four-acre zone, and zoning to require minimum plots of one acre is becoming increasingly common.

Town officials seek to hold school expansion costs down by increasing the zoning requirements. The Town of Mount Pleasant furnishes an example: The tract that GE now holds was to have been a housing development. A builder contracted to purchase the property and planned to build as many as 800 homes. As soon as the plans were announced, the town board rezoned the tract, putting most of it into acre lots. The builder withdrew. Several months later the tract was sold to GE.

The townships that attract the national business firms are in a favorable tax position, but an adjoining town which may not be so favored probably will find itself in a residential building boom. Employees of the firm that builds offices in Town A will build or buy homes in Town B. Town A will reap the tax benefit profit; Town B will be forced to raise taxes to build new schools, roads, sewers, and other

TELEPHONE BUILDING in White Plains. The $8-million long-lines switching and relay center which was started last week for AT&T.

facilities. The county government must concern itself with the problem, although it has no over-all jurisdiction. It can consult and advise, and Pomeroy and his staff are constantly doing just that.

• **New Rochelle study**—The ideal approach, Pomeroy said, is the scientific land use and tax return study made by the city of New Rochelle last year.

A business remains solvent when its operations produce a profit, and that happens only when the bookkeeping department applies the profit-and-loss test to every phase of the business. Very few municipalities undertake this type of bookkeeping. New Rochelle did. Using a carefully weighted formula, it matched the cost of municipal services to all types of property against the tax return.

New Rochelle found that the taxes collected from one-family houses barely paid for the municipal services rendered. It found that with only half the residential zone improved with houses, and a building boom under way, the cost of services would soon forge ahead of the tax return. It found that all other types of residential building—two-family houses and apartment houses, were serviced at a tax loss. Business and industry and vacant land return a tax profit to the city. On the basis of the survey findings, New Rochelle is prepared to spend money to attract more business and light industry.

Frank A. Batstone, planning engineer for the Connecticut Development Commission, says that municipalities are confronted with three alternatives: To continue as residential communities and hike local taxes; remain residential and look for increased state aid for schools, roads, and local facilities; or encourage a diversification of land use through realistic and reasonable zoning.

"Increased residential taxation ultimately comes to the breaking point," Batstone writes. "A decline in municipal revenue is inevitable if such a course is pursued. The second alternative would be an unworthy choice. Instead, through intelligent planning, each land use and municipal function can find its proper inter-relationship."

Pomeroy phrases it another way: No segment of the community, he says, can isolate itself. Each has interlocking economic relationship. Each community should ask itself: Should we encourage building of $10,000 houses? $20,000 and up houses? Garden apartments or luxury apartments? Retail stores? Light industry? Executive offices?

On the county level a five-year plan of capital improvements and expenditures for sewers, roads and other projects is being prepared to cope with the influx of big business.

But county planning would have to be supplemented by far-seeing planning by the cities, townships and villages of Westchester County which must also plan for an influx of new population.

Baltimore beltway plans revealed

The Maryland State Roads Commission and Baltimore County commissioners last week revealed the exact route of the county's $39-million limited-access beltway.

Russell H. McCain, state roads chairman, said the beltway will be a dual-lane high-speed road extending 31.1 mi in a loop around Baltimore city from the new Washington Expressway in the south to Pulaski Highway in the east.

The plan calls for careful landscaping in congested sections and for 50-ft parkways between lanes where the highway runs through wide-open rural land.

• **Selection of route**—McCain emphasized that the route finally decided upon was given exhaustive study by three consulting engineering firms, the State Roads Commission, the State Planning Commission and the county commissioners.

The route, he said, represents an agreement among these groups as to the most practicable and economical route. It was laid out, he added, to keep property damage to a practical minimum.

The consulting engineers on the project are Joseph K. Knoerle; Rummel, Klepper & Kahl, and Baker-Wilberly Co. For the beltway project they associated together as "Associated Consulting Engineers."

• **Costs and design**—The estimate of $39 million for building the beltway includes, besides the construction costs on the main roadway, the interchanges, approach-road improvements and the rights-of-way.

In rural areas the county will acquire 200-ft rights-of-way. This will permit 50-ft parkways, two 24-ft lanes and will leave about 100-ft for future development.

The width of the parkways will permit widening the lanes in the future if it becomes necessary, McCain pointed out.

In congested areas, plans call for obtaining rights-of-way at least 110-ft wide. These areas will be landscaped, and the lanes will be divided by concrete dividing ridges, rather than by parkways.

In studying possible routes for the 31-mi beltway, the consulting engineers used aerial maps and field reconnaissance to make a detailed study of 121 mi of the area.

TWIN-BORE BROADWAY TUNNEL was opened in San Francisco on Dec. 21. It will speed traffic flow from commercial to residential areas of the city. One of the ventilation structures can be seen above the west portals. (Redwood Empire Association photo).

San Francisco tunnel open to traffic

San Francisco's new Broadway Tunnel was opened to traffic for the first time on Dec. 21. Each 28½-ft wide twin bore will handle two lanes of traffic and have a sidewalk.

The 1616-ft long (portal to portal) structure was the center of a controversy between the contractor—Morrison-Knudsen Co., Inc.—and city officials in mid-1951 over adequacy of the lining thickness (ENR Sept. 13, 1951, p 29).

The contractor contended that the entire length of each bore should have a complete circular reinforced concrete lining 3-ft thick. The city's plans, on the other hand, called for 2-ft thick horseshoe-shaped concrete lining for about two-thirds the length. No significant changes in the city's plans were made as result of the controversy.

• **Construction delayed**—Originally scheduled for completion April 30, 1952, construction of the tunnel was delayed by strikes and poorer soil conditions than the contractor had anticipated. Pre-job contractor's plans called for full-face excavation of each bore, using a large power shovel for mucking. But actual construction was accomplished by use of a breast-board jumbo using 18 hydraulic jacks to restrain the tunnel face. This required construction of pilot drafts at the lower corner of each bore to permit casting of concrete wall footings to carry tunnel supports. These footings were actually the lower part of the tunnel lining.

Cost to the city for M-K's work is $6.1 million. But M-K is reported to have spent an additional $2 million on the job.

The tunnel will speed traffic under Russian Hill from the downtown commercial-financial district to the north-central part of the city. It will provide quicker access to the Golden Gate Bridge. A freeway connection is planned from the San Francisco-Oakland Bay Bridge to the intersection of Broadway and the Embarcadero a few blocks from the tunnel's east portal. Thus, there will be quicker travel between San Francisco's two famous bridge structures with the new tunnel being a key factor in facilitating traffic.

• **Ventilation**—Appointments and mechanical features of the underground artery are of more than average interest. The twin bores are lined with pale yellow ceramic tile and illuminated with a continuous string of fluorescent lights supported at the crown.

There are no plenum chambers for tunnel ventilation. Instead the ventilation scheme makes use of the piston action of autos passing through plus large fans at the entering end. The tunnel grade (3% uphill going west) and the prevailing winds (west to east) complicate this scheme. East bound tunnel has two 15-hp fans capable of a 106,000 cfm air output while the west-bound tunnel has two 75-hp fans that can develop 300,000 cfm. More capacity is required in the west-bound bore because the traffic flow and the air flow buck the prevailing wind.

The fans are controlled by air sampling devices that automatically switch on the fans when the carbon monoxide exceeds 0.25%.

$51-million paper plant making rapid progress

Plans for construction and operation of the Bowater Southern Paper Corp.'s $51-million newsprint plant in the Calhoun-Charleston, Tenn., area have been disclosed by J. E. Sirrine Co., Greenville, S. C., engineering firm (ENR July 17, p. 49).

The mill will begin operations in 1954. Initial design capacity has been made for 125,000 tons of newsprint per year, and 50,000 tons annually of either unbleached or bleached kraft pulp.

• **Specifications**—Manufacturing buildings will conform to the following general types of construction:

• Foundations will be cast-in-place concrete piles, 40-ton capacity, with reinforced concrete pile caps, piers and grade beams. Lighter structures will be placed on reinforced concrete spread footings with soil value 2,500 to 3,000 psf. About 7,200 piles will be required.

• Building frames will be of structural steel connected with high tensile strength bolts. About 8,000 tons will be used for buildings and major structures.

• For the roof, precast concrete slabs will be used; with provision to maintain two inches of water on roof surfaces for summer insulation.

• Exterior walls of all buildings will be brick. Interior surfaces of all walls will be buff unglazed structural tile.

• Continuous belts of adjustable alu-

minum louvres will be used for ventilation.

- Floors will be reinforced concrete or welded steel gratings, depending on use and occupancy.
- The main manufacturing plants will roof over about six acres.
- A paved parking area of 300,000 sq ft will take care of about 600 automobiles.
- Southern Railway will serve the site with a spur track 1,500 ft long with 18,000 ft of track inside the plant area.
- For warehousing, five Butler buildings each 40 by 100 ft have been erected for permanent storage with five additional units for construction storage.

• **Contracts**—On June 14, 1952, a contract was let to Oman Construction Co. for general grading—about 1,500,000 cu yd. Grading is practically completed. Raymond Concrete Pile Co. contracted for the 7,200 piles.

General construction contract was awarded to Fraser-Brace and Roane Anderson as a joint venture. Contracts were let to Bethlehem Steel Co. for steel and Grinnel Co., for piping.

Associated with the Sirrine Co. will be Colli-Flynn of McKeesport, Pa., for preparation of architectural plans and designs. Willie Saint-Laurent of Montreal, Canada, will be consultant on wood handling.

1,000-unit housing project killed by court action

A superior court judge has killed, for the time being at least, a 1,000-unit public housing project in Riverside, Calif.

Ruling on a suit by two Riverside taxpayers, Judge Martin J. Coughlin held that the city council's resolution approving a contract with the county housing authority for the project was a legislative act subject to referendum before the contract could be valid. He said he would issue a permanent injunction prohibiting the city or the authority from proceeding with the contract.

The contract was entered into in December, 1949, but lay dormant until May of this year. The two taxpayers—Builder Marshall Tilden and Accountant U. L. Voris—entered suit at that time and obtained a temporary injunction halting a preliminary survey. Voris has since been elected to the city council.

Since the incoming council is regarded as anti-public housing it is unlikely the project will be put up to the voters.

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Turkey pushes hydro development

An extensive program of hydroelectric power development is moving fast in Turkey, with eight stations under construction that will have a combined eventual capacity of 222,145 kw, and another six projected for an additional 119,280 kw.

When Turkey became a republic in 1923 the entire national generating capacity totaled only 53,000 kw. By 1935 it had risen to 126,000 kw and by 1949 to 347,000 kw. Most of this, however, was produced by small industrial and municipal plants. Virtually all was thermal power—70% coal, 16% lignite, 4% hydro-electric and the balance miscellaneous.

Seventy-one percent of the output was used by industry, and there was virtually no inter-connection of stations.

• **Postwar growth**—In 1949, real growth started. In that year a 60,000-kw Metropolitan Vickers low-quality coal plant was completed at Catalagzi to serve the city of Zonguldak, but it has not yet run at full capacity because of restricted demand. However, the Turkish Electrical Research Administration had produced careful plans, and started hydroelectric development with the inauguration of the 4,500-kw Malatya station.

• **Biggest job**—Of the projects, the largest is the Sariyer hydroelectric plant, which is to be connected with the area around Zonguldak, Ankara, Bursa, Eskisehir, and Instanbul. This plant is to have an eventual capacity of 160,000 kw, and will cost $47 million. The transmission lines linking it with the areas it is to serve will cover 490 km and will cost $15.1 million. Construction of this dam is already under way.

The next largest project is that for the Gediz and Menderes valleys and the Izmir area. It is planned to build three large hydro plants, and connect the whole area through a grid system Another large project is for the Seyhan Dam for the irrigation of the Seyhan valley and the supply of electricity to the valley and the Adana-Mersin area.

This power station will have a capacity of 54,000 kw and will cost $29 million. About $2.1 million will be required annually for a variety of small municipal plants, and the total capacity in Turkey should be raised to 500,000 kw by 1954, doubling the 1947 capacity.

The power grids for the Ankara-Istanbul-Zonguldak, the Izmir-Menderes and the Mersin-Seyhan areas, which will be the first of their kind in this country, will be a major step in the economic and industrial development of Turkey.

• **Types of projects**—There are three general kinds of power projects now being considered in Turkey.

The first is that of relatively small municipal and industrial plants, usually thermal power. The second is for medium-sized hydro plants, sometimes connected with irrigation systems. The main plants planned in this group are Sizir-Keyseri, Tortum-Erzurum, Hazargolu-Elazig. Goksu-Konya, and Degirmendere-Trabzon.

Third type consists of large multipurpose projects for power, flood control and irrigation. In this group, construction at Sariyer has started, Seyhan-Adana has been approved and the Izmir-Menderes project is still being considered.

Turkey is an ideal country for using water power in the production of electricity, and the irrigation possibilities of the dams necessary for such power production are another attraction of such plans; particularly since the irrigation and flood prevention of the larger Turkish valleys is a matter of some importance. The Derme-Malatya hydroelectric plant is the only water operated power station of any size at present in operation, and the further building of such plants cannot fail to improve the industrial economy of Turkey by providing cheap power and thereby promoting industrialization.

The United States Mutual Security Agency (ex-ECA) fully realizes the value of the electrification of Turkey and has already alloted some $9 million for that purpose. As examples of the U. S. aid being received, $27 million have been granted for the Sariyer project $25.2 million for the Seyhan scheme and $6.8 million for the smaller Eregli-Istanbul power line.

About 40% of the total scheme is already in hand, the financing has been arranged and construction work started.

Improvements started at two Mexican ports

The Mexican Naval Department's plans to convert Vera Cruz and Tampico into first class ports have passed an important milestone, New port works were inaugurated recently which will facilitate greatly the handling of freight, passengers, and repairs.

The improvements in Vera Cruz included the dry dock of San Juan de Ulua, a terminal for ocean-going passengers, a caulking and repair dock at Punta de Soldado, and other works at a total cost of $13 million.

The construction of floating docks, warehouses, and dredging facilities at Tampico cost an additional $2 million.

New dock for Guatemala

With only one Caribbean port (Puerto Barrios) capable of handling ocean-going ships at dockside, Guatemala is planning construction of two more ports, at a cost of about $10 million. The new harbors would be built at Santo Tomas, and at the mouth of the Sarstoon River, on the British Honduras-Guatemala border.

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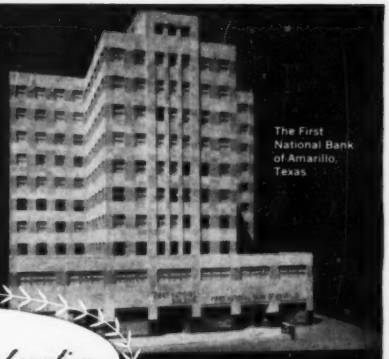

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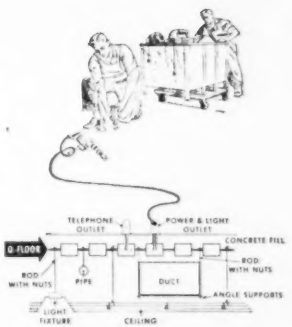

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AASHO presidency goes to Ziegler

Charles M. Ziegler's unanimous election as president of the American Assn. of State Highway Officials on Dec. 12 is only one of a long list of honors and accomplishments.

Ziegler is Michigan's "Mr. Roadbuilder," having served with the State Highway Department for 25 years, for the last 10 of which he has been head of the department.

CHARLES M. ZIEGLER unanimously elected president of AASHO this month.

• **Career**—His first job after graduating (BS in CE) from the University of Michigan in 1913 was with the Ann Arbor Railroad as a junior engineer.

His next job was as assistant city engineer of Saginaw, Mich. Then followed one year as research engineer for the U. S. government at McCook Field, Dayton, Ohio.

In 1919 he joined the Michigan Highway Department and during the next 12 years advanced through the positions of assistant district engineer, district engineer, division engineer, engineer in charge of state construction, construction engineer, and to deputy state highway commissioner—which position he held from 1931 to 1933.

From then until 1943 he was engaged in engineering work in other than state highway work. He served Ingham County, Mich., as its county engineer. He made an unsuccessful bid for the job of State Highway Commissioner in 1937—losing by a vote of 352,000 to 442,000. From 1939 to 1943 he was city assessor of Lansing, Mich.

• **Wins election**—In April 1943 he again set his sights on Michigan's top highway job and this time was successful. He was elected to serve the unexpired two-year term of State Highway Commissioner following the resignation of his predecessor.

Ziegler was re-elected for a four-year term as commissioner in 1945 and again in 1949.

Despite his intense activity in spearheading Michigan's roadbuilding program, he manages to find time to do much work in associations such as AASHO. For relaxation he hunts, golfs and fishes.

Other AASHO vice presidents elected were: A. E. Johnson, Arkansas State Highway Department, first vice president; G. A. Hill, Connecticut State Highway Commission, 1st region of AASHO; D. H. Bray, Kentucky state highway engineer, 2nd region AASHO; R. M. Whitcon, Missouri state highway engineer, 3rd region AASHO; G. T. McCoy, California state highway engineer, 4th region AASHO.

Illinois university post goes to T. J. Dolan

The University of Illinois' Board of Trustees late last month named Prof. Thomas J. Dolan to head the Department of Theoretical and Applied Mathematics in the University's College of Engineering.

Prof. Dolan, a staff member since 1929, succeeds retiring Prof. Fred B. Seely. (ENR Aug. 21, p. 66).

President of the Society for Experimental Stress Analysis, Prof. Dolan is chairman of an American Society for Testing Materials committee on fatigue and latest winner of the ASTM's Templin award, as well as a consultant for the National Science Foundation. He served as a delegate to the World Metallurgical Congress in 1951.

Careers . . .

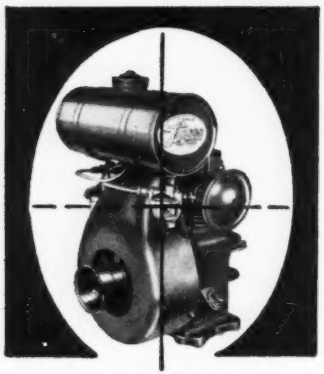
• **Appointed**—Officials of Holmes & Narver, Inc., Los Angeles engineering and construction firm, have announced three additions to the board of directors. They are **Edwin G. Bowen**, vice-president and general manager; **C. S. Sorensen**, vice-president; and **Harry J. Tumidajewicz**, treasurer . . . **Lowell J. Stephenson**, construction engineer for Porter-Urquhart Associates, subsidiary of O. J. Porter & Co., has been named project engineer for the company's work on section 8 of New Jersey's Garden State Parkway . . . In addition to his duties as secretary-treasurer of the American Hoist and Derrick Co., **James F. Bishop** has been named general manager.

Ralph W. Finke, who resigned recently as Seattle's city engineer, is now associated with MacRae Bros., Seattle general contracting firm . . . New chief of the planning and programing division of the Ohio State Highway Department is **John J. Heier**, Columbus, a railroad crossing engineer in the department . . . **W. F. Heavey** will serve as consulting engineer for the Houston, Tex., Port Commission following expiration of his contract as general manager.

• **Elected**—Members of the Asphalt Institute's Board of Directors have elected **D. N. Myers**, president of the Byerlyte Corp., Cleveland, to head the executive committee . . . Wisconsin contractors this month named **Orfal J. Nelson**, La Crosse, president of the Wisconsin chapter of the Associated General Contractors of America, Inc. . . . Installed as president of the Columbus Home Builders Association was **E. G. Fritsche.**

• **Honored**—**John N. Newell**, chief engineer for the Massman Construction Co., Kansas City, Mo., received the Construction Engineering prize from the American Society of Civil Engineers for his design of floating caissons for the bridge across the York River, Yorktown, Va. . . . Two men have been awarded life memberships in the South Dakota branch, ASCE.: **R. B. Easton**, Aberdeen consulting engineer and **Elwin Quinney**, Pierre, an engineer for the state public utilities commission.

• **Resigned**—Directors of the Jennings-Lawrence Co., Columbus civil engineers, have announced the resignation of **R. L. Lawrence** and the election of **Roy T. Underwood** as vice-president and general manager . . . Resignation of **Robert Brady**, an original member of Wheeler-Brady, Inc., Cleveland consulting engineers, has become effective. New name of the firm is Wheeler Associates, Inc.



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LEGAL

When contract is silent as to compensation

An action[1] was brought by a contractor to recover for services rendered under an oral contract for the demolition and removal of the foundation of a diesel engine in defendant's plant.

The contractor claimed that he had entered into the contract in reliance upon the representation of defendant's agent that the foundation was just concrete. There was an agreed price for doing the work.

After the contractor had started the work, he discovered that the foundation was reinforced with steel beams and angle irons. He thereupon demanded that he be paid additional compensation, and claims that the owner agreed orally to pay whatever should prove to be the reasonable cost of the work. The owner, on the other hand, claimed that he had agreed to pay the contractor only an additional $100 to cover the increased cost of doing the work.

At the trial the owner claimed that the original contract required the contractor to perform the work for a definite sum and that no consideration was given to an agreement to pay any additional amount to the contractor; also, that there was no valid contract to pay additional money since there was no agreement between the parties as to the additional money to be paid.

Upon the trial, the court reached the conclusion that there was a valid contract to complete the work at whatever might be the reasonable cost of performing the same.

The court in its opinion stated: "Of course, we thoroughly agree with the well settled principle that an agreement to do what one is already bound to do cannot be considered as a consideration for a new agreement to do the same thing. However we say here that, because of the dispute over the statement on which the original contract is alleged to have been based, and the possibility that as a result of that dispute the plaintiff could have abrogated that contract, his agreement to proceed with the work under a new contract was adequate consideration for the making of that contract by the defendant.

"Nor can we agree with defendant that there is no such thing as a 'contract' where the price or the cost is not fixed. Counsel say that the allegation that there was a contract is inconsistent with the proof that no price was fixed. We think that there may be a perfectly valid contract to do a certain job for whatever proves to be the cost and that such a contract means that the contractor is employed to do the work and that the other party must pay for the work whatever is proven to be the reasonable and proper cost thereof.

"The rule we have in mind is clearly stated in C. J., Vol. 71, Work and Labor, Section 139, Page 164; Contract Silent as to Compensation: 'Where services are rendered, or incidental materials furnished, under a contract not specifying the amount of compensation, the measure of recovery is the fair and reasonable value thereof * * *.'"

(1) Lee v National Cylinder Gas Co., 58 So. 2d 568, Court of Appeal of Louisiana, April 28, 1952.

Pay for unspecified work

"A person performing services not within the terms of the written agreement under which he is operating is entitled to recover the reasonable value thereof under an implied or quasi contract therefor."[1]

In the above case, plaintiff entered into a subcontract to do the electrical work on a building being erected for the government.

The work in question was to be performed pursuant to the plans and specifications of the general contract covering that part of the work. The general specifications made no provision for the refilling of the trenches. When the electrical work was performed, the general contractor, over subcontractor's objections, insisted upon the electrical contractor refilling the trenches.

The subcontractor in the case complied with the request and thereafter brought the action to recover the cost of refilling the trenches and was allowed a recovery.

The court held that the subcontractor was entitled to place full reliance upon the definite and unambiguous language of the specifications, and since the specifications did not impose any obligation upon the electrical subcontractor to refill the trenches, he was entitled to payment for such work when the general contractor, over subcontractor's objections, insisted that he perform this work.

(1) Sagl v Hirt, 52 N.W. 2d 721, Supreme Court of Minnesota, April 4, 1952, and numerous cases there cited.

(These summaries of court decisions are prepared by I. Vernon Werbin, New York attorney and civil engineer.)

OBITUARIES

Philip Louis Inch, 69, a cadastral engineer for the former U.S. General Land Office, later the Bureau of Land Management, died Dec. 6 in Reno, Nev. Early in the century he served with the Montana survey office, and 15 years ago moved to Nevada, where he continued in engineering work.

Max Cyril Bartlett, 61, civil engineer and general manager of Knoxville Utilities Board since 1938, died in Pasadena, Calif., recently. He studied engineering at Washington State University. For a number of years, he was with the engineering firm of Burns & McDonnell of Kansas City. As a representative of that firm he went to Knoxville in 1933 to advise the city on construction of a municipal electric system. He later was made manager of the system and of the utilities board when it was set up permanently.

Robert L. Rolfe, Sr. 65, of Dallas, structural engineer for many Texas buildings, died Dec. 9. A graduate of the University of Colorado, he did government revetment work on the Mississippi River for 12 years before joining Gardner & Howe, Memphis, Tenn. He moved to Dallas in 1924 and established his own business.

Boyd E. Phelps, 51, head of the engineering firm which designed the $22-million Norman Beatty Memorial Hospital at Westville, Ind., died at Michigan City, Ind., Dec. 9. Other jobs handled by the Boyd E. Phelps Co. were the Crane Naval Ammunition Depot, the Evansville water works, the Michigan City water system, and $1.5-million worth of bridges in Marion County.

Thomas L. Love, 90, retired senior assistant engineer of the Rochester, N. Y., office, New York State Department of Public Works, died Dec. 7. He pioneered in development of the transportation system in Monroe County. He retired in 1933 after 32 years of state service.

Howard W. Arrison, 73, a civil engineer, of Upper Darby, Pa., died Nov. 22 at Philadelphia. He was a member of the civil engineering firm of George Mebus Co., Glenside, since 1902, the year he graduated from the University of Pennsylvania. He was the engineer in charge of the planning of the streets, sidewalks and sewers when the town of Merchantville, N. J., was founded in 1907.

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Philip D. Barnard, 2038 Addison, Houston 5, Tex.
Western Steel Prod. Co., 1756 W. 13th Ave., Denver 4, Colo.

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ELSIE EAVES, Manager *J. A. MAHONEY, Reports* *M. R. ROESSLER, Statistics*

NEW ENGLAND

BIDS ASKED—BUILDINGS

▲ **Mass., Wellesley**—MAINTENANCE and TRAFFIC DEPOT LABORATORY—B.A. 12/30—State P. Wks. Dpt., 100 Nashua St., Boston, maintenance and traffic depot laboratory, Jct. 128 and 9. $2,000,000. Plans deposit $50. A. J. Carpenter, 236 Huntington Ave., Boston, archt. CD 11/7/51.

▲ **Conn., New London**—HOUSING—B.A. 1/8—City Housing Auth., New London, 180-unit moderate rental housing. $2,900,000. Thomas Worcester, Inc., 85 State St., Boston, Mass., archt. Delbert K. Perry, 17 Court St., New Britain, assoc. archt. CD 12/13/51.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Bedford Gardens,**, c/o Lester N. Lechter, designer, 8 Maria Ave., Sharon, Mass., Owner Builds, $1,250,000. HOUSING DEVELOPMENT, BEDFORD, MASS.

▲ **Anderson Fairoaks Constr. Co.**, 141 S. Marshall St., Hartford, Conn., CA, $1,125,000, MR-46 HOUSING, incl. 88 units, WALLINGFORD, CONN. Boro of Wallingford Housing Auth., 900 Center St., Wallingford, Conn. Bids Nov. 19. CD 11/26, under LB.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION

▲† **N. Y., Syracuse**—FACILITIES—B.A. 3/11—U. S. Eng., 80 Lafayette St., New York, Zone 13, Air National Guard facilities and bldg., Hancock Field. $1,000,000-$5,000,000. Extended date. Mayer & Whittlesey, 31 Union Square, New York, Zone 3, archts. CD 10/21.

BIDS ASKED—BUILDINGS

▲† **Pa., Letterkenny**—IGLOOS—B.A. 1/7—U. S. Eng., 24 St. and Maryland Ave., P.O. Box 1715, Baltimore, 3, Md., one hundred 2'x8' ft., concrete igloos, outside utilities, Letterkenny Ordnance Depot, Eng. 18-020-53-37. $2,500,000. Plans deposit $10. Extended date. Modjeski & Masters, State St. Bldg., Harrisburg, engrs. CD 12/8.

▲† **N. J., Fort Monmouth**—WAREHOUSES—B.A. 3/12—U. S. Eng., 80 Lafayette St., New York, 13, N. Y., 9 warehouses $500,000-$1,000,000. Greenberg & Ames, 565 Fifth Ave., New York, N. Y., archts. CD 10/15.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ **New Jersey**—R. J. Abbott, comr., State Hy. Dpt., State Hy. Office Bldg., 1035 Parkway Ave., Trenton, **Johnson, Drake & Piper, Inc.**, 80 Trinity Pl., New York, N. Y., LB, $1,474,796, 12 bridges and culverts, incidental grading, paving Route 44 Relocation, Sections 15 A and 16 A from Nehonsey Brook to South Branch of Little Timber Creek in Greenwich and Logan Twps, F-122 (10), Gloucester Co. Bids Dec. 9. CD 11/20.

▲ **Christensen & Neilsen**, 114 Union St., Schenectady, N. Y., LB Approx. $1,750,000. 72 room HOTEL Van Curler addn., SCHENECTADY, N. Y. Schenectady Hotel Co., Inc., Washington Ave., Schenectady, N. Y. CD 12/11.

▲ **Siegfried Constr. Co., Inc.**, 6 N. Pearl St., Buffalo, N. Y. LB $4,431,000, general constr.;
John H. Knox Co., Inc., 1736 Filmore Ave., Buffalo, N. Y., LB $535,000, plumbing;
Quakenbush Co., Inc., 505 Franklin St., Buffalo, N. Y. LB $462,700, heating;
Lang Electric Co., Inc., 273 Oak St., Buffalo, N. Y. $359,436, electrical work for 464 HOUSING units, BUFFALO, N. Y. Buffalo Housing Auth., City Hall, Buffalo, N. Y. Bids Dec. 9.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Uplands, Inc.**, 4625 Edmondson Ave., Baltimore, Md. LB $4,800,000, construct, manage and finance 1,250 brick, concrete block HOUSING units, Bainbridge Naval Training Station, Proj. 052-80010, Projs. 1 and 2, BAINBRIDGE, MD., Fifth Naval Dist., P. Wks. Officer, Norfolk, Va. Bids Oct. 30. CD 10/17.

SOUTH

BIDS ASKED—BUILDINGS

▲ **Va., Norfolk**—HEADQUARTERS—B.A. 1/5—Virginia Electric & Power Co., Boush and Bute Sts., 12 story, 70,000 sq. ft. masonry headquarters bldg. and service center. $1,000,000. T. David Fitz-Gibbon, Royster Bldg., archt. CD 6/26.

SOON LETS CONTRACT—BUILDINGS

▲ **Tenn., Lenoir City**—PLANT—Yale & Towne Mfg. Co., 405 Lexington Ave., New York 17, N. Y., soon lets contract mfg. plant. $1,000,000. CD 11/10.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

Louisiana-Mississippi Pipeline Constr. Co. of North Carolina, P. O. Box 87, Charlotte, N. C. CA, Approx. $500,000, natural gas lines at Staunton; Approx. $350,000, natural gas lines, at Waynesboro, VIRGINIA. Virginia Gas Distribution Corp., c/o contractor.

▲† **Grannis & Sloan, Inc.**, P. O. Box 3006, Fayetteville, N. C., **F. C. Cline Paving Co.**, 6 E. Davie St., Raleigh, N. C. and **T. A. Loving & Co.**, P. O. Box 989, Goldsboro, N C. CA $2,690,000, grading and utilities ENG 31-075-53-8, FORT BRAGG, N. C. U. S. Eng., 308 Customhouse, Wilmington, N. C. Bids Dec. 9. CD 11/14.

ALABAMA—State Hy. Dpt., Montgomery,
Clyde O. Mitchell, 104 N. 44 St., Birmingham, Ala., CA, $676,918, grading, paving 10.658 mi. road from Guin toward Hamilton, F-173 (4), Marion Co. Bids Nov. 19. CD 12/3, under LB.

▲ **P. A. Buchanan Contg. Co.**, 630 Woodland Ave., S.W., Birmingham, Ala., CA, $1,459,292, natural gas system exten., FORT PAYNE, ALA. City, Fort Payne, Ala. Bids Nov. 26. CD 12/5, under LB.

† **Southeastern Electric Constr. Co.**, Box 581, Andalusia, Ala. CA $624,000. electrical 13.8 KV distr. sys., at Michoud Ordnance Plant, Inv. 53-68, NEW ORLEANS, LA. U. S. Eng., 606 Santa Fe Bldg., Galveston, Tex. CD 12/1, under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Virginia Eng. Co., Inc.**, 29th St. and James River, Newport News, Va. CA, $2,713,000. 340 masonry DWELLING units, Public Housing Community VA-3-5, NEWPORT NEWS, VA. Newport News Redevelopmnt & Housing Auth., P.O. Box 77, Newport News, Va. Bids Oct. 28. CD 11/3, under LB.

Fiske-Carter Constr. Co., Box 1251, Spartanburg, S. C. LB $594,000. HOUSING Projects SC 8-9, 8-10, 8-13, 8-14, 8-7 and 8-7, INMAN, JONESVILLE and LANDRUM, S. C. State Regional Housing Auth. No. 1, Laurens, S. C. Bids Dec. 10. CD 11/18.

Bowen-Baggett Constr. Co., Quincy, Fla., LB, $584,479. 85 HOUSING units, BLAKELY, GA. Blakely Housing Auth., Blakely, Ga. Bids Dec. 9. CD 12/5.

▲ **Carter Builders, Inc.**, 707 Brown Ave., Columbus, Ga., Owner Builds, $3,000,000, 600 RESIDENCES, COLUMBUS, GA.

Salter Constr. Co., 750 Linwood Blvd., Columbus, Ga., Owner Builds, $500,000, 50 RESIDENCES, COLUMBUS, GA.

▲ **W. H. Herrin**, Lakeland, Fla., Owner Builds, $2,500,000 265 RESIDENCES, LAKELAND, FLA.

PROJECTS COVERED

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $34,000; other public works $60,000; industrial buildings $82,000; other buildings $300,000.

Classes of Construction
(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED WORK: Including appointment of engineers or architects.

BIDS ASKED (new announcements only). For full calendar, see also preceding issues of ENR.

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

Symbols and Abbreviations Include:

† Federal Government
▲ Project of $1,000,000 or over.
B.A. Bids Asked
ENR Engineering News-Record
CD Engineering News-Record Construction Daily

E. W. Fast, Jr., 4990 Haines Road, St. Petersburg, Fla., Owner Builds, $500,000. 50 RESIDENCES, ST. PETERSBURG, FLA.

▲ **M. T. Reed Constr. Co.**, P.O. Box 1066, Jackson, Miss. CA $1,126,333. HOSPITAL, GULFPORT, MISS. City, Gulfport, Miss. CD 12/5, under LB.

L. A. Warlick Contg. Co., 747 E. 11 St., Chattanooga, Tenn. CA, $556,830, District OFFICE and GARAGE, CHATTANOOGA, TENN. State Hy. Dpt., Nashville, Tenn. Bids Dec. 9. CD 12/2.

MIDDLE WEST

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **George Sheaf & Co.**, 449 Neilston Ave., Columbus, O., LB, $972,245, academic bldg., 7-stall fire station, guard house and 4 squadron operations bldgs., concrete block, brick, steel, Lockbourne Air Force Base, Serial No. ENG. 46-032-53-22, COLUMBUS, O. U. S. Eng., 237 Fourth Ave., Huntington 18, W. Va. Bids Dec. 9. CD 11/14.

INDIANA—State Hy. Comn., Indianapolis,
Rock Road Constr. Co., 5915 Rogers Ave., Chicago, Ill., LB, $217,862, est. $218,914, bit. coated aggregate pavement 0.265 mi. and bit. coated aggregate resurf. 8.617 mi. State Rd. 55 from Fowler to Goodland, Benton and Newton Counties;
Wayne Paving Co., 1935 Lincoln Tower, Fort Wayne, Ind., LB, $242,515, est. $245,833 bit. conc. resurf. 0.591 mi. b. conc. base wid'n., 2.386 mi. and b. conc. resurf. 1.013 mi State Rd. Pierceton to S. of Lake Wawasee, Pierceton, Kosciusko Co.;
Berns Constr. Co., 312 E. Washington St., Indianapolis, 4, Ind., LB, $953,718, est. $1,052,342, c. conc. 5.286 mi. U. S. Rd. 41 from north of Kentland to north of State Rd. 16, Kentland, Newton Co.;
W. L. Magaw, Hawkins Rd., Richmond, Ind., LB, $770,854, est. $829,282, c. conc. base wid'n., b. conc. resurf. 11.647 mi. State Rd. 40 from Cambridge City or Richmond, Wayne Co.;
rejected bids Dec. 9, c. conc. 0.904 mi. State Rds. 5 and 150 Aurora, Dearborn Co. Bids Dec. 9. CD 11/21.

▲ **WISCONSIN**—State Hy. Comn., State Office Bldg., Madison,
McLean-Astleford Co., 400 W. 78 St., Minneapolis, 9, Minn., CA, $387,526, grading, draining 3.249 mi. Red Wing-U. S. H. 10 Road, U. S. Hy. 63, Proj. F 028-1 (33) Contract 1, Pierce Co.;
Streu Constr. Co., 2004 14 St., Two Rivers, Wis., CA, $872,672, c. conc. 4.585 mi. Highland and Military Aves., City of Green Bay, U. S. Hy 41, Proj. T 060-1 (1), Contract 1, Brown Co. Bids Dec. 9. CD 11/21.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Hagerman Constr. Co.**, 403 E. Superior St., Fort Wayne, Ind., CA, $4,268,884, 5 story, irregular, brick, stone women's RESIDENCE HALL, main bldg. with 4 wings, BLOOMINGTON, IND. Indiana University, Administration Bldg., Bloomington, Ind. Bids Oct. 2, awarded Dec. 6. CD 10/13, under LB.

WEST OF MISSISSIPPI

BIDS ASKED—BUILDINGS

▲ **Tex., Rockwell**—PLANT—Bids Asked—The Folsom Co., 3104 Oak Lane, Dallas, plant for mfg. heating equip. $2,250,000. CD 12/9.

▲ **Tex., Rockwall**—PLANT—Bids Asked—Texas Aluminum Corp., c/o Dick Pickens, Rockwall, aluminum fabrication plant, $7,500,000. CD 12/9.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **E. E. Cloer**, Box 9278, Fort Worth, Tex., CA $2,654,834. construct, manage, finance, 340 HOUSING units, NOY 240&3, Proj. No. 48, CORPUS CHRISTI, TEX. U. S. Govt., P. Wks. Office, Civil Engineer, 8th Naval Dist. Bldg., 16 New Orleans, La. Bids Oct. 22, awarded Dec. 8. CD 10/28, under LB.

Sanders Constr. Co., Sherman, Tex., CA, $554,641, 70 DWELLINGS units, ALAMOGORDO, N. M. Alamogordo Housing Auth., Alamogordo, N. M. Bids Oct. 28, awarded Dec. 8. CD 11/6, under LB.

FAR WEST

SOON LETS CONTRACT—BUILDINGS

▲ **Calif., Palmdale**—FLIGHT CENTER—Lockheed Aircraft Corp., 2555 N. Hollywood Way, Burbank, soon lets contract jet flight center. $20,000,000. Pereira & Luckman, 7421 Beverly St., Los Angeles, engrs. CD 8/21.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† **Carl N. Swenson Co., Inc.**, 1095 Stockton Ave., San Jose, Calif., LB, $1,643,500, chamber bldg. and 8 ft.

supersonic wind tunnel, Inv. No. A 9080, MOFFETT FIELD, CALIF. National Advisory Comm. for Aeronautics, Ames Aeronautical Laboratory, Moffett Field, Calif. Bids Dec. 8. CD 11/19.

BUILDINGS
LOW BIDS AND CONTRACTS

▲ Robert E. McKee, Inc., 4700 San Fernando Rd., Los Angeles, Calif., CA. $3,665,100, HEALTH and RECEIVING HOSPITAL, LOS ANGELES, CALIF. City, City Hall, Los Angeles, Calif. Bids Nov. 26, awarded Dec. 5. CD 12/5, under LB.

† Wohl-Calhoun Co., 845 N. Highland St., Los Angeles, Calif., LB, $841,136, Electronics LABORATORY BLDG. 125 for jet propulsion lab., California Institute of Technology, ENG 04-353-53-47, PASADENA, CALIF. U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif. Bids Dec. 5.

▲ Barringer & Botke, 333 Riverside Dr., Santa Paula, Calif., LB, $1,489,890 Anacapa Junior High SCHOOL, VENTURA, CALIF. Ventura High School Dist., 295 S. Arcade St., Ventura, Calif. Bids Dec. 8. CD 11/21.

CANADA

HEAVY CONSTRUCTION
LOW BIDS AND CONTRACTS

Canadian Vickers Co. Ltd., Maisoneuve St., Montreal, Que., CA, $676,000, constr. 8 sluice gates, for dam on Winnipeg River, Mc Arthur Falls, MANITOBA. Hydro-Electric Bd. Comrs., Winnipeg, Man. CD 1/17/45.

BUILDINGS
LOW BIDS AND CONTRACTS

Luney Bros. & Hamilton Ltd., 825 Bay St., Victoria, B. C., CA, $580,995, rein.-con. Naval LABORATORY, ESQUIMALT, B. C. Defence Constr. Ltd., 360 Homer St., Vancouver, B. C. Awarded Nov. 28. CD 12/3.

Proposed Projects

WATER SUPPLY

▲ Miss., Jackson—City, City Hall, addnl. water mains, $1,412,000, Black & Veatch, 4706 Broadway, Kansas City, Mo., consult. engrs. CD 8/11/50.

Tex., Odessa—City, c/o Casey Fannin, city mgr., (a) enlarging 2 water pumping plants, $450,000, (b) elevated steel water storage tank, $90,000, (c) installing water mains, distr. lines in newly annexed areas, $618,000. CD 4/10/50.

SEWERS, WASTE DISPOSAL

▲ Mo., St. Louis—City, Frank J. McDevitt, pres. Bd. P. Service, 304 City Hall, 12 and Market Sts., Zone 3, relief trunk storm and foul water sewer for Harlem-Baden Distr. in northern part of city, incl. about 5 mi. arched concrete tunnel ranging from 10½ ft. to 23½ ft. in diam. between point near Natural Bridge Ave. and Goodfellow Blvd. to Mississippi River adjacent to foot of Bittner St. $12,871,610. Horner & Shifrin, Shell Bldg., 1221 Locust St., Zone 3, consult. engrs. CD 3/18/49.

▲ Tex., Beaumont—City, City Hall, sanitary sewage disposal facilities, $6,175,000. Joe J. Rady, Baytown, and George J. Schaumburg, 2678 Laurel St., Beaumont, consult. engrs. CD 7/31.

BRIDGES

▲ D. C., Wash.—Govt. of District of Col., District Bldg., bridge (somewhere between Memorial and Key bridges) over Potomac River, $20,000,000; bridge over Potomac River at Jones Point, Alexandria, Va. $20,000,000.

▲ Tex., Houston—City, City Hall, 900 Brazos St., underpass and approach roads to connect Hardy and Elysian Sts. to McKee St. $1,000,000. W. E. White, c/o owner, engr. CD 6/5/51.

STREETS AND ROADS

▲ Ala., Mobile—Comrs. Mobile Co., Court House, Imprv. 100 mi. county roads. $4,000,000. CD 1/30.

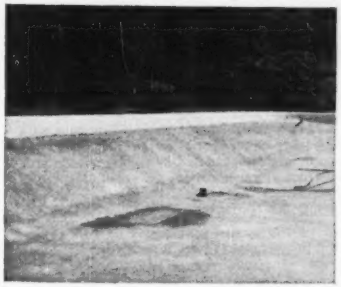
▲ Neb., Bellevue—City, long range paving program. $2,000,000.

▲ NORTH CAROLINA—State Hy. & P. Wks. Comm., Raleigh,
Guilford Co.—relocate Hy. 70 around Greensboro. $1,000,000.

▲ TEXAS—Sam Houston Turnpike Corp., c/o J. Edw. Johnson, M. & W. Tower Bldg., Dallas, 276 mi. 4-lane toll highway from Dallas-Fort Worth to San Antonio, $150,000,000. Roy W. Smith, c/o owner, engr.

EARTHWORK, WATERWAYS

▲ California—Oakdale Irrigation District of Oakdale and South San Joquin Irrigation Dist. of Manteca, have each voted $26,000,000 bonds, for joint construction of Tri-Dam Project, $52,000,000. International Engineering Co., 74 New Montgomery St., San Francisco, engr. CD 11/13.



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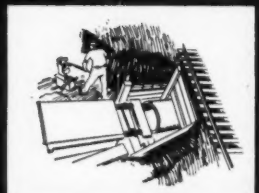

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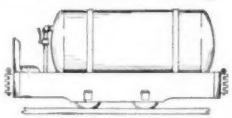

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▲ **Calif., Napa**—Napa Co., Court house, $3,000,000 bond election Jan. 20, dam on Putah Creek. CD 8/20.

▲ † **Illinois**—U. S. Eng., 420 Locust St., St. Louis, 2, Mo. installing about 100 underseepage relief wells in Wilson and Wenkel and Prairie du Pont Levee and Sanitary District, Monroe and St. Clair Counties, involving 6000 ft. drilling to average depth 60 ft., etc.; installing about 200 underseepage relief wells in East Side Levee and Sanitary Dist. of Madison and St. Clair Counties, involving 12,000 ft. drilling to average depth of 60 ft., etc.; constr. about 0.8 mi. levee involving 50,000 cu. yd. excav., altering existing sewers, gravity drains and pumping plants, East Side Levee and Sanitary Dist., Proj. Item I-B (4), Madison and St. Clair Counties; about 1.9 mi. levee involving 510,000 cu. yd. excav., altering existing pumping plant, East St. Louis Levee and Sanitary District, Proj. Item I-A, Madison and St. Clair Counties; installing about 150 underseepage relief wells, etc. in Wood River Drainage and Levee Dist., Madison Co., involving about 9,000 ft. drilling to average depth of 60 ft., etc.; about 2.7 mi. earthen levees and 3 drainage structures, involving 800,000 cu. yd. excav., etc., Wood River Drainage and Levee Dist. Proj. Items III-E and IV-A, Madison Co.; installing about 420 underseepage relief wells in Preston Drainage and Levee Dist., Union Co., Clear Creek Drainage and Levee Dist., Union and Alexander Counties and East Cape Girardeau and Clear Drainage Dist., Alexander Co., involving 25,200 ft. drilling to average depth 60 ft., etc.; 4 mi. levee embankment involving 1,200,000 cu. yd. excav. and 6 drainage structures being Grand Tower Drainage and Levee Dist., Proj. Item II-F and II-G Jackson Co.; installing about 300 underseepage relief wells in Degognia and Fountain Bluff Levee and Drainage Dist., Jackson Co. and Grand Tower Drainage and Levee Dist., Jackson Co., involving 18,000 ft. drilling to average depth of 60 ft., etc., installing about 300 underseepage relief wells in Columbia Drainage and Levee Dist., Monroe Co., Prairie du Rocher and vicinity, Randolph Co., involving 18,000 ft. drilling to average depth 60 ft., etc. Each job to cost $100,000 to $1,000,000.

▲ † **Iowa**—U. S. Eng., Clock Tower Bldg., Rock Island, Ill. constr. Stage II of 38 ft. lift Lock No. 19 in Mississippi River with chamber of 1,200 ft. usable length and 110 ft. width landward of existing lock and drydock on Mississippi River. Over $1,000,000.

▲† **Nebraska-Kansas**—Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver, Colo. 4,000 ft. long, 84 ft. high Lovewell Dam and Reservoir, on White Rock Creek, tributary Republican River, Bostwick Div., 11 mi. south of Superior, Neb. $9,000,000. CD 9/8/44.

AIRPORTS

† **Ariz., Chandler**—RUNWAY, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., runway and extending runway, $800,000; taxiway and extending taxiway, $350,000; electronics maintenance and training aids bldg., $350,000; UHF radar air-ground facility, $300,000; airfield lighting (for 12-30 Primary runway), $300,000, at Williams Air Force Base.

▲† **Ariz., Phoenix**—RUNWAY, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., exten. runway, taxiway, $2,250,000; base maintenance shops, cold storage and meat cutting, Squad H.Q. bldg., A10 warehouse, $1,200,000; apron, $750,000; A/C Maintenance hangar, $750,000; airfield lighting, $300,000; jet fuel storage AC, $300,000; utilities, $300,000, Luke Air Force Base. CD 11/13/51.

▲† **Ariz., Yuma**—DORMITORY, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., AM dormitory, officers' mess (100-men) B O Q, A10 warehouse $700,000; runway exten., taxiway exten., $600,000; shooting-in-butt, ordnance storage igloos, ordnance repair shop, $400,000; electric supply utilities, $350,000; jet fuel storage, $300,000 at Yuma County Airport.

▲† **Ark., Jackson**—AIR BASE—U. S. Eng., 300 Broadway Little Rock, Air Base incl. paving, liquid fuel storage, lighting operational bldgs., maintenance bldgs. troop housing, medical bldg., storage and utilities. $23,700,000.

▲† **Calif., March Air Force Base**—BARRACKS, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, two 3 story AM barracks (masonry) and one 500-man mess-administration bldg., at West March Air Force Base, $1,500,000; A/C maintenance hangar, $3,500,000; addnl. refueling facility, $1,500,000; recon tech. bldg. (Photo lab), $1,250,000; airport surveillance radar facility, ILS, $300,000, all foregoing March Air Force Base. CD 12/25/52.

▲† **Calif., Muroc**—WAREHOUSE, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, A/C warehouse and QM warehouse, $7,500,000; runways, $8,000,000; 26.4 mi. roads, $1,500,000; rocket static test facility, components test laboratory, $1,500,000; warehousing (supply and storage), $750,000; backfill of mud mines, $750,000; vehicle maintenance facility, $750,000; unconventional fuel storage, $750,000; railroad spur and railroad spur (to A.C. supply and QM. warehouses), $600,000; tech. engr. administration bldg. and instr. and records proc. lab., $600,000; 12 kv electrical distr. sys., $600,000; airmen's club and officers' mess, $600,000; central kitchen and cafeteria, $300,000; troop housing- 3 AM barracks 594-man, $1,500,000; crash and fire station, $300,000; telephone bldg., $300,000; commissary sale store, $300,000; post bakery, $300,000, all foregoing at Edwards Air Force Base. CD 4/5/51.

▲† **Calif., Victorville**—RUNWAY EXTEN., etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, runway exten.,

and strengthening, taxiway exten. and strengthening, $1,000,000; warehousing facilities, $300,000; PX sales store, $300,000; airfield lighting, $300,000, at George Air Force Base. CD 11/7/51.

▲† **La., Lake Charles**—TRAINING BLDG. etc.— U. S. Eng., 60th Santa Fe Bldg., Galveston, Tex., plans by Ricciuti, Stoffle & Assoc., Queen & Crescent Bldg., New Orleans, training bldg., base supply warehouse, chapel, etc. Lake Charles Air Force Base, $1,000,000. CD 11/28.

▲ † **Neb., Lincoln**—AIR STATION—Ninth Naval Dist., Great Lakes, Ill., airfield pavements, fuel storage, communications, roads, utilities. Naval Air Station, $3,000,000.

▲† **Nev., Las Vegas**—AIR FORCE BASE—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., extend runways, taxiways, harmonization range, $2,000,000; jet fuel storage AG, railroad spur, storage, five igloos, $1,000,000; bachelor officers quarters, $750,000; aircraft maintenance bldg., communications and electronics shop, $350,000; motor pool parking area, vehicle maintenance shop, $600,000; aircraft maintenance hangars (2), $600,000; airfield lighting $300,000; service club, $300,000; utilities, $300,000; UHF radar air-ground facility, $300,000, all foregoing at Nellis Air Force Base. CD 5/21/51.

▲ † **N. C., Raleigh-Durham**—TROOP CARRIER BASE—U. S. Eng., 308 Customhouse, Wilmington, troop carrier base at Raleigh-Durham Airport, $12,000,000. Wm. C. Olsen, 5 Exchange Pl., Raleigh, consult. engr.

▲† **O., Dayton**—RESEARCH BLDG.—U. S. Eng., 830 W. Broadway, Louisville, Ky., plans by York & Sawyer, 101 Park Ave., New York, N. Y., 3 story Aero-Medical Altitude Test Research Bldg., roads, etc. $1,000,000; 3 story officers quarters, $1,000,000, Wright-Patterson Air Force Base in Area C, between State Rte. 4 and Officers Quarters. CD 9/27/51.

▲† **Tex., Abilene**—AIR BASE—U. S. Eng., 100 W. Vickery St., Fort Worth, misc. constr. $4,000,000; liquified fuel storage, $500,000; fueling sys., $600,000; communications facilities, $750,000; navigation aids, $400,000; general shops, $4,500,000; runways, $3,000,000; taxiways, $1,000,000; operational facilities, $1,000,000; aircraft maintenance facilities, $2,000,000; storage or warehouses, $5,000,000, David S. Castle, Sr. & Jr., D. Boone, L. Kanto, F. C. Olds, E. B. Yeatts, Abilene, consult. engrs. on foregoing projects; area paving, $1,000,000; airfield lighting, $150,000; water sys., $75,000; sewers, $90,000; natural gas distr. sys., $75,000; roads, $100,000, James D. Allen, H. L. Tucker, P. T. Lindberg, Wm. N. Collier, Jr., Abilene, consult. engrs, on foregoing projects. CD 6/23.

▲ **Tex., Rockwall**—AIRPORT—City, municipal airport. $1,500,000.

LATIN AMERICA

▲ **Mexico, Reynosa**—Petroleous Mexicanos (Pemex), c/o Paulino Nava, Mexico City, plans housing for employees. $1,300,000.

PUBLIC BUILDINGS

▲ † **Ariz., Luma**—TEST STATION—U. S. Eng., 751 S. Figueroa St., Los Angeles, Calif., Yuma Test Station Development, $2,000,000; artillery and small arms repair shops, Ammo. Assembly Bldg. No. 4, constant temp. ammo. magazine, utilities, etc., $1,000,000; technical services, operations bldg., utilities, and site development, $800,000; 3 EM barracks officers and civilian mess, $350,000; chronograph and photo lab., star gauging and instr. calibr. lab., $100,000, Yuma Test Station.

▲ **Calif., Ontario**—SCHOOLS—Chaffey Union High School Dist., Ontario, $3,000,000 bond election Jan. 30, schools. CD 10/17/47.

▲ † **Del., Newark**—PLANT—Dpt. Army, Pentagon Bldg., Wash., D. C., plans by Albert Kahn Associated Architects & Engineers, Inc., 345 New Center Bldg., Detroit, Mich., 1 story tank plant, $3,000,000. Chrysler Corp., 341 Massachusetts Ave., Detroit, Mich., will operate. CD 12/5.

▲ **Ga., Rome**—HOSPITAL—Floyd Co., Rome, hospital addn. $1,500,000.

▲ **Ia., Mason City**—SCHOOLS—Bd. Educ., Mason City, plans by Hansen & Waggoner, Mason City, Washington and Roosevelt Elementary Schools, $1,200,000. CD 11/11.

▲ **Kan., Manhattan**—MUNICIPAL—City, W. B. Avery, mgr., plans by F. O. Wolfenbarger, Ulrich Bldg., municipal bldg. $1,000,000. CD 11/20/45.

▲ **La., New Orleans**—HOUSING—New Orleans Housing Auth., 1111 Tulane Ave., 680 housing units, Proj. LA 1-10, $5,000,000. CD 9/15/49.

▲† **Md., Aberdeen Proving Ground**—CLIMATIC TESTING FACILITIES—U. S. Eng., 24 St. and Maryland Ave., Baltimore, Zone 18, 1 story, brick, steel, concrete irregular dimensions climatic testing facilities, 2 laboratories, utilities, $2,500,000, Blow Knox Constr. Co., Farmers Bank Bldg., Pittsburgh, Pa., engr. CD 11/17/50.

▲ **Md., College Park**—LIBRARY—University of Maryland, College Park, plans by Henry Powell Hopkins, 10 E. Mulberry St., Baltimore, library, $2,000,000. CD 1/31/50.

▲ **Md., Glenn Dale**—SANITORIUM—Dist. of Columbia, District Bldg., Wash., D. C., 800-bed main hospital subsidiary structures, expansion of Glenn Dale Tuberculosis Sanitorium, $15,000,000.

▲ **Mich., Redford**—SCHOOL—Redford Twp., John Turner, secy. Redford School Bd, voted bonds Dec. 5, brick, steel, concrete high school, incl. auditorium, gymnasium, Schoolcraft St. west of Beech St. $1,750,000.

▲ **N. J., Camden**—HOUSING—Camden Housing Auth., City Hall, housing, $4,000,000.

▲ † **N. Y., Brooklyn**—POSTAL CENTER—U. S. Post Office Dept., 12 St. and Pennsylvania Ave. N. W., Wash., D. C., Brooklyn Postal Center, comprising 3 bldgs., between Atlantic Ave. and Pacific St. from Vanderbilt to Fifth Aves., $25,000,000.

▲ **O., Dover**—GENERATING UNIT—City, generating unit for municipal power plant. $1,500,000. CD 10/8/47.

▲ **Tenn., Blountville**—SCHOOL—Sullivan Co. Bd. Educ., Blountville, Bloomingdale School. $1,000,000.

▲ **Tenn., Nashville**—HIGH SCHOOL—Davidson Co. Bd. Educ., Court House, plans by Edwin Keeble, Glen Echo Rd., rebuild Hillsboro High School. $1,000,000. CD 11/14.

▲ **Tex., Dallas**—COURT HOUSE, etc.—Dallas Co., Court House, plans by Smith & Warder, Grand Prairie, Broad & Nelson, 505 N. Erway St., and Jack Corgan, Melba Bldg., expansion court house and jail. $2,000,000. CD 11/7.

▲ **Tex., Houston**—HOSPITAL—City, City Hall, 900 Brazos St., and Harris Co., Court House, 500-bed Psychiatric Hospital in Texas Medical Center, $5,000,000

▲ **Tex., Houston**—MUSEUM—Houston Museum of Natural History, c/o City of Houston, City Hall, main bldg. of Museum of Natural History, $1,000,000; museum of public health, $1,500,000; planetarium, $1,500,000; science library, $1,650,000; public aquarium, $1,850,000; botanical garden, $2,500,000. CD 1/8/48.

▲ **Tex., Houston**—WAREHOUSING—Port of Houston, Wharf 13, general warehouse, $3,500,000. Knappen-Tippetts-Abbett-McCarthy Engineers, 62 W. 47 St., New York. N. Y., consult. engrs. CD 11/19.

▲ **B. C., Vancouver**—HOUSING—Central Mortgage & Housing Corp., 360 Homer St., 200-unit low-rental housing at Little Mountain, $1,500,000. CD 10/18/50.

▲ **N. B., St. John**—HOSPITAL—St. John General Hospital. R. H. Gale, supt., 300-bed hospital addn. $4,000,000.

▲ **Ont., Millbrook**—REFORMATORY DEVELOPMENT—Dpt. P. Wks., Toronto, plans by Barnett & Rieder, 644 Bayview Ave., Toronto, reformatory development to house 250-300 criminals. $1,500,000-$2,000,000. CD 8/28.

COMMERCIAL BUILDINGS

▲ **Ala., Birmingham**—SHOPPING CENTER—Second Avenue Development Co., c/o Lawrence S. Whitten, Brown-Marx Bldg., remodeling shopping center. $1,000,000.

▲ **Ill., Hillside**—SHOPPING CENTER—Hubert E. Howard, 999 Lake Shore Dr., Chicago, Zone 11, plans by Bruce A. Gordon, 1 N. LaSalle St., Chicago, Zone 2, shopping center, 53½ acre at Wolf Rd. and Congress Expressway, $20,000,000.

▲ **Kan., Topeka**—SHOPPING CENTER—E. E. Brunkow, 3400 Topeka Blvd., plans by Roger Frangkiser, 803½ W. 39 St., Kansas City, Mo., shopping center, 8 acres of commercial bldgs., 23 acres parking, etc., ½ mi. south on US-75, $3,500,000.

▲ **Mich., Grayling**—HOSPITAL—Sisters of Mercy, Hospital Advisory Bd., Dr. C. R. Keyport, chn., Grayling, brick, steel, concrete hospital. $1,000,000.

▲ **Mich., Lansing**—HOSPITAL—Edward W. Sparrow Hospital, Bd. Trustees, 1215 E. Michigan St., plans by Ollie J. Munson, 409 Wilson Bldg., 4 story hospital unit with two 2 story wings, power plant, two 2 story nurses home addns., alterations to Oak Park annex, $1,700,000.

▲ **Mo., Joplin**—OFFICE—Stewart Stanley, 120 E. 4 St., professional office. $1,750,000.

▲ **Mo., St. Louis**—HOSPITAL—Evangelical Deaconess Society of St. Louis, c/o Deaconess Hospital, Rev. Dr. Elmer H. Hoefer, chn. Bd. Directors, 6150 Oakland Ave., Zone 10, plans by Charles M. Gray & James Auer, 3800 W. Pine Blvd., Zone 8, 4 story, brick, rein.-con., steel hospital addn., 6150 Oakland Ave. $2,000,000. CD 3/6/51.

▲ **Pa., Phila.**—HOTEL—Arthur W. Binns, Inc., 2221 Chestnut St., plans by Morris J. Rosenthal, Commercial Trust Bldg., hotel, 2213-17 Chestnut St. $1,000,000.

▲ **R. I., East Providence**—SHOPPING CENTER—Owner, c/o Saul J. Copellman, 295 Washington St., Boston, Mass., 400,000 sq. ft. masonry, concrete shopping center, incl. stores, super market, Tauntin and E. Pawtucket Aves. Approx. $1,200,000.

▲ **Tex., Dallas** — GYMNASIUM—Southern Methodist University, Dallas, gymnasium and general utility bldg. $1,500,000.

▲ **Alta., Calgary**—APARTMENT—S. A. Vineberg, 1390 W. Sherbrooke St., Montreal, apartment, $1,000,000.

▲ **B. C., Victoria**—STORE—Woodward Stores (Victoria) Ltd., 852 Douglas St., plans by J. C. Page, c/o owner, present store exten. or new department store, Pandora Ave. and Cormorant at Douglas Sts. $2,000,000.

▲ **Ont., Toronto**—HOUSING—Rex Heslop Homes Ltd., Rexdale Dr., Weston, 400 homes housing development and utilities, 100 acres in Etobicoke Twp., west of here, Approx. $3,000,000.

▲ **Que., Dorval**—SHOPPING CENTER—Dorval Gardens Realty Corp., 231 St. James W., Montreal, plans by Mayerovitch & Bernstein, 1500 St. Catherine St. W., Montreal, shopping center, incl. large supermarket, near Circle, $1,000,000.

▲ **Que., Montreal**—HOUSES—Paul Aubuchon, 155 Somerville Ave., 250 houses with bsmnts., Henry, Ager, Alfred, Brunet, Racette and Tanguay Sts. $2,500,000.

▲ **Que., Montreal**—SHOPPING CENTER, etc.—Gerard Daneau Ltd., 5950 Cote des Neiges Rd., plans by C. Greniер, 170 Geneva Crescent, Mount Royal, shopping centre, theatre, etc., Van Horne Ave., $10,000,000-$15,000,000.

▲ **Que., Montreal**—OFFICE—Syndicate. c/o Irving S. Backler, engr., 1250 McGill College St., 15 story office, Mayor and City Councillors Sts., $1,000,000; 15 story, concrete, structural steel, brick, stone office, Sherbrooke St. W. and Aylmer St., $1,000,000; 10 story office, Sherbrooke St. west of Guy St., $790,000.

INDUSTRIAL BUILDINGS

▲ **Conn., Bridgeport**—PLANT EXPANSION—General Electric Co., Boston Ave. and Bond St., plans by Westcott & Mapes, 109 Church St., plant expansion $3,000,000. CD 12/2.

▲ **Ga., Chamblee**—PLANT—Eastman Kodak Co., 343 State St., Rochester N. Y., plant, $2,000,000.

▲ **Ill., Chicago**—WAREHOUSE—E. J. Brach & Sons Co., 4650 W. Kinzie St., plans by Naess & Murphy, 80 E. Jackson St., Zone 4, warehouse, Crawford and Chicago Aves. $1,500,000. CD 3/23/50.

▲ **Ill., Chicago**—FACTORY—Zenith Radio Corp., 6001 W. Dickens St., plans by Shaw, Metz & Dolio, 208 S. La Salle St., Zone 4, 300,000 sq. ft. factory addn. $3,000,000.

▲ **Ind., Columbus**—WAREHOUSE, etc.—Public Service Co. of Indiana, Plainfield, plans by Naess & Murphy 80 E. Jackson St., Chicago, 4, Ill., 1 story warehouse, garage and office. $1,500,000. CD 12/12/50.

▲ **Kan., Kansas City**—PLANT—General Motors Corp., Buick-Oldsmobile-Pontiac Assembly Plant, c/o E. D. Rollert, plant mgr., Fairfax and Kindelberger Rds., plant expansion, incl. 7 bldgs., lengthen test runway by 1,200 ft., lighting throughout existing plant, 180,000 lb. steam per hr. power house, third electric power line, sheet metal work bldg. for chassis, R. R. shipping for planes bldg. with docks and tracks, water softener unit, automatic paint bldg. with 11 new paint lines for spray and ovens, 2 aircraft testing bldgs., fuel sys. and flight refueling equip., office, armor bldg., supplementary drainage sys., pump station, incl. parking space, Fairfax Ind. Dist. Approx. $7,000,000.

▲ **Ky., Louisville**—FACTORY—American Air Filter Co., Central Ave., plans by Austin Co., engr.-archt., 16612 Euclid St., Cleveland, O., 200x400 ft. factory mfg. glass fibre, office, boiler plant, $1,000,000.

▲ **Mich., Detroit**—WAREHOUSE-SALES—Parke Davis & Co., H. B. Duncan, sales mgr., Joseph Campau St. at river, brick, steel warehouse-sales branch on 100,000 sq. ft. site, East Jefferson and Adair Sts. $1,000,000.

▲ **N. C., Hamlet**—FREIGHT YARD and SHOP—Seaboard Airline R.R. Co., W. D. Simpson, ch. engr., S.A.L. R.R. Bldg., Norfolk 10, Va., freight classification yard; diesel shop, $9,000,000.

▲ **S. C., Lancaster**—PLANT—Carl W. Mullis Lumber Co., Lancaster, plant addn. $1,500,000.

▲ **Tex., Houston**—PLANT—Wyatt Metal & Boiler Works, Washington St., and MKT Ry. tracks, sand blasting shop unit, $150,000; steel sheds $175,000; group of small allied shop bldgs. $250,000; expansion of Eureka Plant, $1,000,000; steel plate pickling process plant unit, $300,000, on the Katy Rd. tract, near here.

▲ **Tex., Nederland**—REFINERY—Pure Oil Co., Nederland, reconst. petroleum refinery cracking unit. $1,000,000.

▲ **B. C. Kamloops**—OIL REFINERY—Kamloops Refinery Syndicate, c/o Syd Smith, pres., Kamloops, oil refinery $3,000,000.

UNCLASSIFIED

▲ **Fla., Miami**—STADIUM—City, City Hall, Orange Bowl Stadium addn. $1,000,000.

▲ **Indiana and Michigan**—PIPE LINE—Standard Oil Co. of Indiana, 910 S. Michigan Ave., Chicago, Ill., 243 mi. pipe line from Whiting, Ind. to Detroit, Mich. $11,550,000.

▲ **Kansas-Nebraska**—PIPE LINE—Consumer Co-operative Assn., c/o Howard A. Cowden, pres. and genl. mgr., N. W. 10 and Oak Sts., Kansas City, Mo., 48½ mi. 6 in. pipe line from Holdrege, Neb. to Phillipsburg, Kan. crude oil line catalytic cracking unit at Phillipsburg, Kan. plant, $5,000,000.

▲ **Oklahoma**—OIL PRODUCTS LINE—Bell Oil & Gas Co., National Bank of Tulsa Bldg., Tulsa, 12 in. oil products line from Ardmore to Cushing, $3,000,000. Samuel J. Lubell, c/o owner, engr.

▲ **Tex., Houston**—WHARVES—Port of Houston, c/o Wharf 13 Wharf No. 1, $2,500,000; Wharf No. 2, $2,750,000; Wharf No. 3, $2,000,000; Wharf No. 4, $2,375,000; Wharf No. 5, $2,500,000; Wharf No. 6, $2,450,000; Wharf No. 7, $2,925,000; general outside utilities, incl. water, gas lines, lighting sys., sewers, streets, roads, $750,000; completion of facilities for railroad terminal, $1,250,000; railway track extens., $500,000; railway storage yards, $2,500,000; spoil disposal plant units, $2,500,000; railway car classification and storage, $3,000,000. Knappen-Tippetts-Abbett-McCarthy Engineers, 62 W. 47 St., New York, N. Y., consult. engrs. CD 11/19.

▲ **Saskatchewan**—GAS PIPE LINE—Saskatchewan Power Corp., 1739 Cornwall St., Regina, 115 mi. 10 in. gas pipe line from Brock-Coleville field to Saskatoon. $7,000,000. W. B. Clipsham, ch. engr. E. J. Dunn-constr. engr.

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

BIDS ASKED—BUILDINGS

Mass., Northbridge—SCHOOL—B.A. 1/7—Town, School Dpt., Junior-Senior High School (Whitinsville). $950,000. Plans deposit $50, refundable. Leland & Larsen, 814 Statler Bldg., Boston, archts. Cleverdon Varney & Pike, 120 Tremont St., Boston, struct. engrs. CD 12/18/51.

Mass., Holyoke—HOSPITAL—B.A. 1/15—City, Bd. P. Wks., City Hall, city infirmary at hospital, Ingleside St., Proj. Mass. 46 (C). $850,000. Plans deposit $50, refundable. Frederick H. Franz, 70 Nonotuck St., archt. CD 5/2/51.

BUILDINGS

LOW BIDS AND CONTRACTS

Kittery Homes, Inc., c/o Lester N. Lechter, designer, 8 Maria Ave., Sharon, Mass. Owner Builds. $800,000. one hundred and ten 1 story, 26x36 ft. RESIDENTIAL UNITS, KITTERY, ME. CD 12/15.

▲ Frouge Constr. Co., Inc., 74 Goodsell St., Bridgeport, Conn. LB. $1,653,000, CONN 2-D-1 temporary HOUSING, Forest Hill Home, GROTON, CONN. Public Housing Admin., 141 Milk St., Boston, Mass. Bids Dec. 10. CD 11/21.

MIDDLE ATLANTIC

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
STREETS AND ROADS
January 6 Maryland

▲ N. Y., Buffalo—B.A. 1/15—Dpt. P. Wks., City Hall, vertical lift bridge carrying S. Park Ave. over Buffalo River. $2,300,000. Extended date. CD 12/11.

BIDS ASKED—BUILDINGS

▲ N. Y., North Bellmore—SCHOOL—B.A. 1/5—Bd. Educ., Central School Dist. 3, North Bellmore, Junior High School, Jerusalem Ave. $2,000,000.

▲ N. Y., North Merrick—SCHOOL—B.A. 1/5—Bd. Educ., Central School Dist. 3, North Bellmore, Junior High School, S. Merrick Ave. $2,000,000.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ NEW YORK—Bureau Contracts & Accounts, The Governor Alfred E. Smith State Office Bldg., Albany, received no bids Dec. 15, constructing steel superstructure on Thruway Bridge between Tarrytown and South Nyack, providing steel truss and girder spans for 3 mi. of the bridge, Rockland and Westchester Counties. $35,764,000. To be redesigned and re-advertised at a later date. CD 11/18

▲ Corbetta Constr. Co., 220 E. 42 St., New York 17, N. Y., CA. $3,927,068, pier and bulkhead shed superstructure and other work of New Pier 57, North River, Manhattan Boro, Cont 2751, NEW YORK, N. Y. Comr. Marine & Aviation, Pier A, North River, foot of Battery Pl., New York 4, N. Y. Bids Nov. 14. CD 11/18, under LB.

▲ NEW JERSEY—State Hy. Dpt., 1035 Parkway Ave., Trenton,
Poirier & McLane Corp., 33 W. 42 St., New York, N. Y., CA, $1,749,089, 10 bridges, culverts and incidental grading and paving on Sections 11A, 14A and 15B of Route 44 Relocation from Delaware St. to Swedesboro Ave., Paulsboro, F-122 (11), Gloucester Co. CD 12/9, under LB.

▲ MARYLAND—State Rds. Comn., 108 E. Lexington St., Baltimore, Zone 2,
F. P. Asher Jr. & Sons, Inc., 1715 West Exten., Annapolis, Md. LB. $1,054,835 stone, $1,054,135 slag, grading, drainage, surf. 0.282 mi. dual hy., 3 level interchange structure, ramp connections, steel plate girder bridge over Baltimore-Annapolis Ry., Contr. AA 263-22-515, Anne Arundel Co. Bids Nov. 8. CD 10/27.

▲† C. J. Langenfelder & Sons, 8427 Pulaski Hy., Baltimore, Md., LB, $2,589,086, stone;
Williams Constr. Co., Inc., Middle River, Md., LB, $2,509,926, slag, aircraft parking and taxi service space, Dover Air Force Base, Eng. 36-109-53-10, DOVER, DEL. U. S. Eng., 121 N. Broad St., Phila., Pa. Bids Dec. 3. CD 11/5.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Saul M. Siegel, c/o Henry H. Moger, Jr., archt., 250 Main St., White Plains, N. Y. Owner Builds. $1,800,000. 90 HOUSES on 57-acre tract bounded by Peekskill Parkway, Route 9A and Chappaqua Rd., BRIARCLIFF MANOR, N. Y.

▲ Roosevelt Terrace Apartments, c/o Carol Management Corp., 12 E. 48 St., N. Y., 17, N. Y. Owner Builds. $4,500,000, four 9 story APARTMENTS, 85 and 86 Sts. between 35 and 37 Aves., JACKSON HEIGHTS, N. Y. Philip Bernbaum, 12 E. 48 St., N. Y., 17, N. Y., archt.

▲ Grayco Builders, 106-21 Continental Ave., Forest Hills, N. Y., LB, $1,293,267, PUBLIC SCHOOL No. 2, Fulton Ave. and E. 170 St., Bronx Boro, NEW YORK, N. Y. Co-ordinator School Constr., 49 Flatbush Ave. exten., Brooklyn, 1, N. Y. Bids Dec. 3. CD 11/5.

▲ Caristo Constr. Corp., 26 Court St., Brooklyn 2, N. Y. LB. $1,734,000, Junior HIGH SCHOOL 120, 161 St., from Trinity to Caldwell Aves., NEW YORK, N. Y. Bd. Educ., Bureau Constr., 49 Flatbush Ave. exten., Brooklyn 1, N. Y. Bids Dec. 8. CD 11/17.

▲ Gotham Constr. Corp., 501 Fifth Ave., New York 17, N. Y. LB. $1,479,800, PUBLIC SCHOOL 191, Amsterdam Ave., 60 and 61 Sts., Manhattan Boro, NEW YORK, N. Y. Co-ordinator of School Constr., 49 Flatbush Ave. exten., Brooklyn 1, N. Y. Bids Dec. 1. CD 11/5.

▲ Francis J. Kleban & Assocs., 32 E. 37 St., N. Y., 16, N. Y. Owner Builds. $3,000,000, 15 story OFFICE, 5 Ave. and 56 St., NEW YORK, N. Y. CD 10/23.

▲ Laurence J. Rice, 30 Deepdene Rd., Forest Hills, N. Y. LB. $1,207,000, PUBLIC SCHOOL 87, W. 78 St. between Amsterdam and Columbus Aves., NEW YORK, N. Y. Bd. Educ., Bureau Constr., 49 Flatbush Ave. exten., Brooklyn 1, N. Y. Bids Dec. 4. CD 11/13.

▲ Laurence J. Rice, 30 Deepdene Rd., Forest Hills, N. Y. LB. $1,023,000, PUBLIC SCHOOL 156, 156 St. and 8 Ave., Manhattan Boro, NEW YORK, N. Y. Co-ordinator of School Constr., 49 Flatbush Ave. exten., Brooklyn 1, N. Y. Bids Dec. 2. CD 11/5.

▲ Turner Constr. Co., 420 Lexington Ave., New York, 17, N. Y., CA, $3,500,000, RESEARCH CENTER, Spackenkill Rd., POUGHKEEPSIE, N. Y. International Business Machines Corp., 590 Madison Ave., N. Y. 22, N. Y. CD 5/16.

▲ Mellon Stuart Co., 210 E. Parkway, N.S., Pittsburgh, Pa., CA, $1,300,000, 6 story, 79x190 ft., brick, tile, steel SERVICE and DISTRICT OFFICE, 4 and Ferry Sts., PITTSBURGH, PA. Remington Rand, Inc., 315 Fourth Ave., New York, N. Y. Bids Nov. 17. CD 11/13.

▲† Hughes-Foulkrod Co., 809 Schaff Bldg., Phila., Pa. LB. $1,439,019, est. $1,500,000. 200x1,200 ft., concrete block, steel general purpose WAREHOUSE, utilities; LB. $354,655. concrete block, steel flammable materials WAREHOUSE, outside utilities, Letterkenney Ordnance Depot, CHAMBERSBURG, PA. U. S. Eng., 24 St. and Maryland Ave., Baltimore, Md. CD 10/30.

▲† John Tester & Son, Inc., 1620 Second St., N.W., Wash., D. C. LB. $1,198,728. 7 LABORATORIES and INDUSTRIAL BLDG., with outside utilities at Randle Cliff Naval Research Laboratory, CHESAPEAKE BEACH, MD. Dist. P. Wks. Office, Potomac River Naval Command, Naval Gun Factory, Wash., D. C. Bids Dec. 10. CD 11/13.

SOUTH

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ A. G. Pinkston & Co., 1805 County St., Portsmouth, Va., LB, $1,032,444, approx. 139,000 lin. ft. 8 in. vitr. clay sanitary sewers, appurtenances, PORTSMOUTH, VA. City, Municipal Bldg., Portsmouth, Va. Bids Dec. 10. CD 11/13.

▲ GEORGIA—State Hy. Dpt., Atlanta,
Seaboard Constr. Co., P. O. Box 558, Brunswick, Ga., LB, $1,258,617, grading, paving Turtle River Bridge approaches, 3.177 mi. Brunswick, Georgia-Jacksonville, Fla. road, beginning at north end of Turtle River Bridge and extending north to A.C.L. Railroad Spur on State Rt. 25 and incl. connections to Fourth Ave., Gloucester St. and St. Simons Island Causeway incl. paving Lanier Blvd. between 4 and Elm Aves. Bids Dec. 12. CD 11/24.

▲ Zenith Constr. Co., Box 10175, New Orleans, La. LB. $866,719. Contr. 1; LB. $916,356. Contr. 2. water storage facilities;
Barnet Brezner, P.O. Box 654, Alexandria, La. LB. $173,700, water treatment plant;
Chicago Bridge & Iron Co., Standard Bldg., Houston, Tex. LB. $74,100. water storage tank, CONVENT, LA. Bd. Comrs. Red River Parish Waterworks Dist. No. 2, Convent, La. Bids Dec. 9. CD 12/3.

▲ Henry Bickel Co., 1020 E. Chestnut St., Louisville, Ky. and Chas. E. Cannell Co., 2138 S. Floyd St., Louisville, Ky. CA $1,246,000. 60 in. concrete water main from Crescent Hill Pumping Station to Bardstown Rd., LOUISVILLE, KY. Louisville Water Co., S. Third St., Louisville, Ky. CD 12/9. under LB.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Carl W. Mullis Lumber Co., Lancaster, S. C. Owner Builds. $1,600,000. PLANT addns., LANCASTER, S. C. CD 12/9.

▲ Geo. D. Auchter Co., foot of 56 St., Jacksonville, Fla., CA, $1,159,970, HOUSING PROJECT FLA 1-3, incl. 171 units, JACKSONVILLE, FLA. Jacksonville Housing Auth., Jacksonville, Fla. Bids Dec. 10. CD 11/11.

▲ Gervais Favrot Co., Balter Bldg., New Orleans, La. CA $4,090,986. 14 story HOTEL, STORE, OFFICE, University Place and Common St., NEW ORLEANS, LA. Westminster Corp. Harry Latter, pres., 919 Gravier St., New Orleans, La. August Perez & Assn., Audubon Bldg., New Orleans, La., archts. Awarded 12/6. CD 1/4/51.

MIDDLE WEST

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
STREETS AND ROADS
December 30 Indiana

BIDS ASKED—BUILDINGS

▲ Mich., Lansing—POWER PLANT—B.A. 1/12—City, O. E. Eckert, genl. mgr. Bd. Light Comn., 116 W. Ottawa St., superstructure, brick, steel, concrete power plant addn., Moores Park Station, Spec. S 1281-26, $6,000,000. Plans deposit $25, refundable. Burns & Roe, Inc., 233 Broadway, New York, N. Y., engr. CD 11/12/51.

SOON LETS CONTRACT—BUILDINGS

▲ Ill., Evanston—HOME—James C. King Home for Old Men, 360 E. Garfield Blvd., Chicago, soon lets contract 6 story, men's home, Grove and Oak Sts. $1,125,000. Holabird & Root & Burgee, 180 N. Wabash St., Chicago 1, Ill., archts. CD 7/9.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲ J. A. Jones Constr. Co., 209 W. Fourth St., Charlotte, N. C. CA. $6,680,198. Hoover Dam and Reservoir, COLUMBUS, O. City, City Hall, Columbus, O. Bids Dec. 9. CD 12/12, under LB.

▲ Herlihy Midcontinent Co., 135 S. La Salle St., Chicago, 3, Ill., LB. $1,096,247, 2-level superhighway Wacker Dr. from Adams St. to Jackson Blvd., CHICAGO, ILL. City, City Hall, Chicago, Ill. Bids Dec. 11. CD 11/28.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ Community Development, Inc., Engineers Bldg., Cleveland, O., CA. Approx. $3,000,000. 40 brick, redwood and glass APARTMENT, garden-type bldgs., on 30-acre site fronting Snow Rd. near Stumph Rd., PARMA, O. Snow Village, Inc., c/o contractor. CD 5/13/52.

▲ La Salle Constr. Co., 343 S. Dearborn St., Chicago 4, Ill., CA, $1,000,000, CHURCH, ST. CHARLES, ILL. First Methodist Church of St. Charles, 4 and Main Sts., St. Charles, Ill. Bids Nov. 20, awarded Dec. 11. CD 11/19.

WEST OF MISSISSIPPI

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
BRIDGES
January 9 Minnesota and North Dakota

BIDS ASKED—BUILDINGS

▲ Tex., Mineral Wells—HOUSING—B.A. 1/15—U. S. Eng., 100 W. Vickery St., Fort Worth, construct, manage and finance 300 military housing units, $2,400,000; 150 military housing units, $1,225,000; 50 rental military housing units, $375,000. Wolters Air Force Base, Proj. No. 113-80008 Air Force No. 6, Eng. 41-443-53-28. CD 12/3.

▲ Tex., Waco—DORMITORY—B.A. 1/15—Baylor University, 1401 S. 5 St., women's dormitory. $750,000-$1,000,000. Extended date. Easterwood & Easterwood, 601-2 Service Mutual Bldg., archts. R. S. Smith, T. & P. Bldg., and L. E. Kanto, N. P. Anderson Bldg., Fort Worth, engrs. CD 12/10.

▲ Tex., Waco—DORMITORY—B.A. 1/22—Baylor University, 1401 S. 5 St., women's dormitory. $750,000-$1,000,000. Extended date. Easterwood & Easterwood, 601-2 Service Mutual Bldg., archts. R. S. Smith, T & P Bldg., and L. E. Kanto, N. P. Anderson Bldg., Fort Worth, engrs. CD 12/16.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ H. B. Zachry Co., Box 2570, San Antonio, Tex., CA. Approx. $3,850,000, (1st unit) of electric POWER PLANT, known as Lon C. Hill Station to have total 66,500 kw.; CA $68,885, road constr. and asph. paving of same and also some area paving; CA $71,175, dirt or earthwork in the 140-acre tract; CA $63,190, storm and sanitary sewers and some open drainage, CALALLEN, TEX. Grand total $4,053,250, Central Power & Light Co., 120 N. Chaparral St., Corpus Christi, Tex. CD 8/22.

▲ J. E. Morgan & Sons, Box 6029, Dallas, Tex. CA $2,432,956. general contr., heating, plumbing, electrical work. BASE SCIENCE BLDG. Southwestern Medical School of University of Texas, DALLAS, TEX. The University of Texas, Bd. Regents, Main Bldg. 205, Austin, Tex. Bids Dec. 3, awarded Dec. 10. CD 12/9, under LB.

A. J. Rife Constr. Co., Box 7096, Dallas, Tex., CA $722,781, 3 INDUSTRIAL bldgs., incl. gas motor shops and storage, DALLAS, TEX. Dallas Housing Auth., 2524 Lucas St., Dallas, Tex. Bids Nov. 21. CD 12/9, under LB.

▲ W. S. Bellows Constr. Co., 716 N. Everton St., Houston, Tex. CA $8,500,000. all-electric completely integrated lumber mfg. PLANT consisting 18 steel frame type bldgs., totalling 700,000 sq. ft. floor space, SILSBEE, TEX. Kirby Lumber Corp., Kirby Bldg., Houston, Tex. CD 10/15.

FAR WEST

BIDS ASKED—HEAVY CONSTRUCTION
STATE HIGHWAY LETTINGS
STREETS AND ROADS
January 7, 8 California

▲† Idaho, Mountain Home—QUARTERS—B.A. 1/20—U. S. Eng., City-County Airport, Walla Walla, Wash., six 2 story frame bachelor officers' quarters, Mountain Home Air Force Base, Inv. 53-26. $1,000,000. CD 9/18/51.

Calif., Midway City—B.A. 1/22—Midway City Sanitary Dist., 14842 Monroe St., sanitary sewer mains, pumping station, appurtenances. $850,000. Plans deposit $25. J. R. Lester Boyle, Spurgeon Bldg., Santa Ana, engr. CD 4/3/51.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

† **J. H. Trisdale, Inc.**, Box 779, Redding Calif., L.B. $847,365, est. $579,090, Schedules A, D, E, F, and G. clearing 7 areas in Albeni Falls Reservoir, incl. lower 3½ mi. Clark Fork River, all on Pend Oreille Lake and 28 mi. Pend Oreille River, Bonner Co., Inv., 53-29, IDAHO. U. S. Eng., 4735 E. Marginal Way, Seattle, 4, Wash. Bids Dec. 10. CD 11/20.

▲† **Utah Constr. Co.**, 144 East Broadway, Salt Lake City, Utah. CA $2,486,613, est. $3,202,207 constr. 3.3 mi. Gateway Tunnel 9 ft. dia., concrete lined, Weber Basin Proj., UTAH. Bureau Reclamation, Dpt. Interior, Ogden, Utah. CD 11/21, under LB.

▲† **Peter Kiewit Sons' Co.**, 345 Kieways Ave., Arcadia, Calif., LB, $1,682,673, est. $1,767,532 earthwork, concrete lateral lining and structures for Unit 3, Mohawk Distribution System, Gila Proj., DC 3836, ARIZONA. Bureau Reclamation, Dpt. Interior, Yuma, Ariz. Bids Dec. 10. CD 11/10.

▲† **Lembke-Clough & King**, P.O. Box 1391, Las Vegas, Nev. CA. $1,064,415, test structures and facilities, Nevada Proving Ground, Inv. 53-10, TONOPAH, NEV. U.S. Atomic Energy Comn., 1235 S. Main St., Las Vegas, Nev. Awarded Dec. 13. CD 12/16, under LB.

▲ **Guy F. Atkinson Co.**, 9210 N.E. Halsey St., Portland, Ore., CA. $1,291,685, superstructure: CA. $1,186,794, 41 bridge piers steel cantilever bridge, THE DALLES, ORE. Wasco Co., Court House, The Dalles, Ore. Bids Oct. 15, awarded Dec. 8. CD 10/21, under LB.

† **Wonderly Constr. Co.**, 2694 Lime St., Long Beach, Calif., LB. $936,663, est. $922,188. Ortega and Carpinteria reservoirs and control stations, Cachuma Proj., Spec. DC 3834, CALIFORNIA. Bureau Reclamation, Dpt. Interior, Goleta, Calif. Bids Dec. 9. CD 11/7.

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Clarence Ward Constr. Co.**, 4841 Harvey St., Fresno, Calif., LB $1,095,075, Ft. Miller Junior High SCHOOL, FRESNO, CALIF. Fresno City Unified School Dist., 2348 Mariposa St., Fresno, Calif. Bids Dec. 11. CD 11/26.

▲ **Webb & Knapp Constr. Corp.**, 270 Park Ave., New York, 17, N. Y., CA. Approx. $9,500,000, 140 two-story APARTMENT for 1,024 families in Mission Bay-Claremont Section on 63-acre tract, SAN DIEGO, CALIF. Claremont Garden Apartments, c/o contractor. Freeland, Peterson & Evenson, Spreckles Theater Bldg., San Diego, engrs. Abrams & Eschenbach, 1150 Silverado St., La Jolla, Calif., archts.

▲† **Grove, Shephard Wilson & Kruge, Inc.**, 2 Pine St., San Francisco, Calif., LB, $4,800,000 electric-electronic SHOP, Mare Island Naval Shipyard, NOY 75169, Spec. 35366, VALLEJO, CALIF. Twelfth Naval Dist., San Bruno, Calif. Bids Dec. 10. CD 11/13.

CANADA

BUILDINGS

LOW BIDS AND CONTRACTS

▲ **Parkside Constr. Co. Ltd.**, Kitchener, Ont., Owner Builds. $3,500,000, HOUSING DEVELOPMENT, in Rosemount sub-station, and SHOPPING CENTER, KITCHENER, ONT.

▲ **Piggott Constr. Co. Ltd.**, 1250 Bay St., Toronto, Ont., CA. $1,000,000, 7 story, two wings, 157,000 sq. ft., OFFICE, University Ave. at Armory St., TORONTO, ONT. Bell Telephone Co. of Canada, 76 Adelaide St. West, Toronto, Ont. Bids Dec. 2, awarded Dec. 11. CD 11/17.

▲ **Bourget Constr., Inc.**, 307 O'Brien Blvd., Ville St. Laurent, Que. Owner Builds. $1,500,000, HOUSING DEVELOPMENT, ST. LAURENT (Postal .. District Montreal), QUE.

ALASKA

BIDS ASKED—HEAVY CONSTRUCTION

▲† **Alaska**—HOSPITAL—B.A. 1/30—U. S. Eng., Evergreen Hall, 3013 Arcade Bldg., Seattle 1, Wash., 7 story, 173x172 ft., 40x366 ft., 87x108 ft. rein.-con. hospital, Elmendorf Air Force Base, Inv. ENG 95-507-53-34, $9,800,000. Extended date. Plans deposit $50. Skidmore, Owings & Merrill, 1 Montgomery St., San Francisco, Calif., archts. CD 12/11.

HEAVY CONSTRUCTION

LOW BIDS AND CONTRACTS

▲† **Baker & Ford Co.**, Bellingham, Wash., LB $1,136,196, est. $1,127,667, two 37x220 ft., 3 story rein.-con. airmen's dormitories, one 14,000 sq. ft. 1 story, masonry mess and admin. bldg., with outside utilities, ENG 95-507-53-3, Ladd Air Force Base, ALASKA. U. S. Eng., 1303 Arcade Bldg., Seattle 1, Wash. Bids Dec. 10. CD 11/12.

▲† **Lease & Leigland and M-B. Contg. Co.**, 1501 N. 35 St., Seattle 3, Wash., CA. $5,422,540, supply concrete aggregates and grout for constr. work at Ladd and Eielson Air Force Bases, Inv. No. 53-40, ALASKA. U. S. Eng., Anchorage, Alaska. Bids Dec. 2. CD 12/11, under LB.

(Proposal Advertisements see p. 66 to 68)

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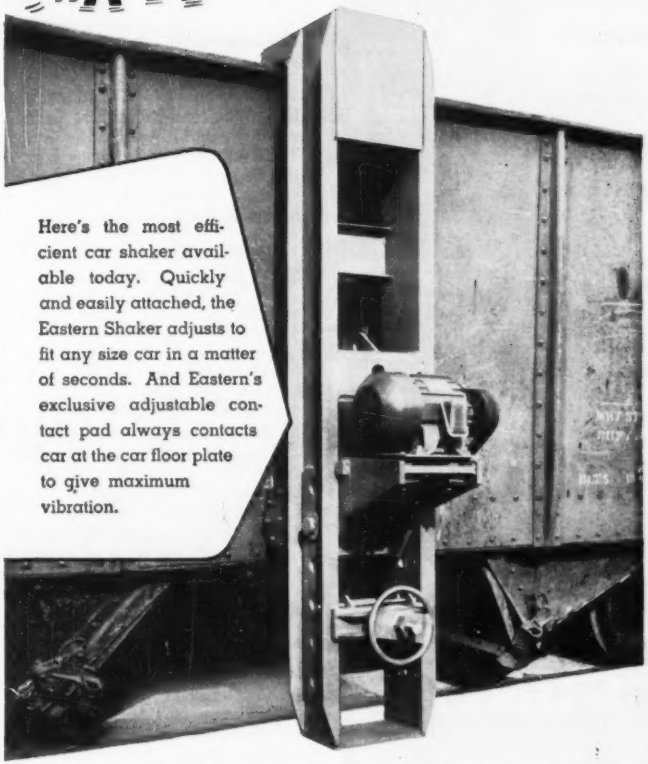

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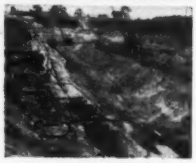
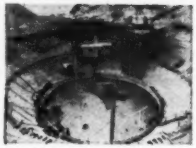


BUILDINGS



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UNIT PRICES

Meadowside main sewer, Connecticut

A large number of bidders characterized the competition for a $133,308 sewer project in Milford, Connecticut. The contract was finally awarded by the town of Milford to F. B. O'Neil & Co., Wethersfield, Conn., the lowest of the eleven bidders. In the widely separated bids, the high bid, by Westcott Construction Co., was 76% above the low; the second low, 1% above the low bid; and the engineer's estimate by Metcalf & Eddy, Boston, 5% above the low.

The job, which started Nov. 20 and is to be completed by June 27, 1953, includes construction of sewers and appurtenances, including a cast iron force main, gravity sewer and pressure sewer. To be used are: 3,055 linear feet of 15 inch reinforced concrete pipe; 3,985 linear feet of 8 to 15 inch vitrified clay pipe; and 1,800 linear feet of 10 inch cast iron pipe. One thousand linear feet of the 15 inch reinforced concrete pressure pipe are to be constructed on piles with timber platform support.

Skilled workers are receiving approximately $3.50 per hour and common labor, $2.00 per hour on this project. All material is to be furnished by the contractor.

Bidders include:

1C F. B. O'Neil & Co., Wethersfield, Conn.	$133,308
2 J. Andreassi, Roslindale, Mass.	134,820
12 Westcott Constr Co., No. Attleboro, Mass.	234,290

Bids: 10-27-52 Items	Unit	Quantity	Unit Prices 1 C	2
Earth exc & refill, 0'-9'	cy	5,000	$3.00	$2.00
Earth exc & refill, 9'+	cy	2,000	3.00	2.00
Rock exc & disposal	cy	350	10.00	10.00
Earth exc below normal grade	cy	500	5.00	5.00
Gravel Refill	cy	500	4.00	4.00
Drainage	ls	1	3,500	8,000
Furn, lay, jt 15" conc press pipe, incl gr	lf	3,055	8.50	7.00
Furn, lay, jt 15" ex strg VC pipe, incl grav cr	lf	1,125	12.00	7.00
12"	lf	890	8.00	5.00
10"	lf	1,390	7.50	5.00
8"	lf	580	5.00	4.00
Furn, lay, jt 10", CI 150, CI pipe, etc	lf	1,800	5.50	6.00
Furn, lay, CI fits, incl scr gr or CI B conc	lb	5,000	0.40	0.35
Const MH bases, 4'-0" dia.	ea	14	30.00	70.00
Conc MH walls, incl domes & CI steps	vf	105	30.00	35.00
Const MH along pressure pipeline	ea	6	200.00	600.00
Const MH, sta 44+12	ls	1	900.00	600.00
47+10	ls	1	500.00	600.00
50+00	ls	1	500.00	600.00
Stubs in MH	ea	5	10.00	10.00
Single drops at MH	vf	20	10.00	5.00
Furn & set CI MH frames & covers	ea	17	50.00	55.00
Chimneys for sewer conn	vf	50	8.00	5.00
CI A conc sup for sewer pipe on piles, etc	lf	1,000	3.00	15.00
CI B conc cradle	lf	100	3.00	4.00
F & P bituminous surface	lf	5,000	1.35	1.75
Furn equip for driv pile	ls	1	300.00	5,000
Furn, drive, & cut off wood piles	ls	1,400	2.00	2.00
Furn, lay jt 6" VC stand pipe for house conn	lf	500	4.00	4.00
Lumber left in place	Mfbm	10	160.00	160.00
F & I, 8' gate valves & boxes	ea	4	150.00	250.00
10"	ea	1	225.00	300.00
12"	ea	1	250.00	350.00
Clean up & miscell	ls	1	3,000	500.00

Four span bridge Maryland & D.C.

The District of Columbia and the State of Maryland are to be connected by a four span bridge over the Anacostia River. The $1,459,244 contract for construction of the bridge was awarded by the Department of Commerce, Bureau of Public Roads, to the Charles H. Tompkins Co., Washington, D. C. The Tompkins Co. entered the lowest bid among eleven competing contractors.

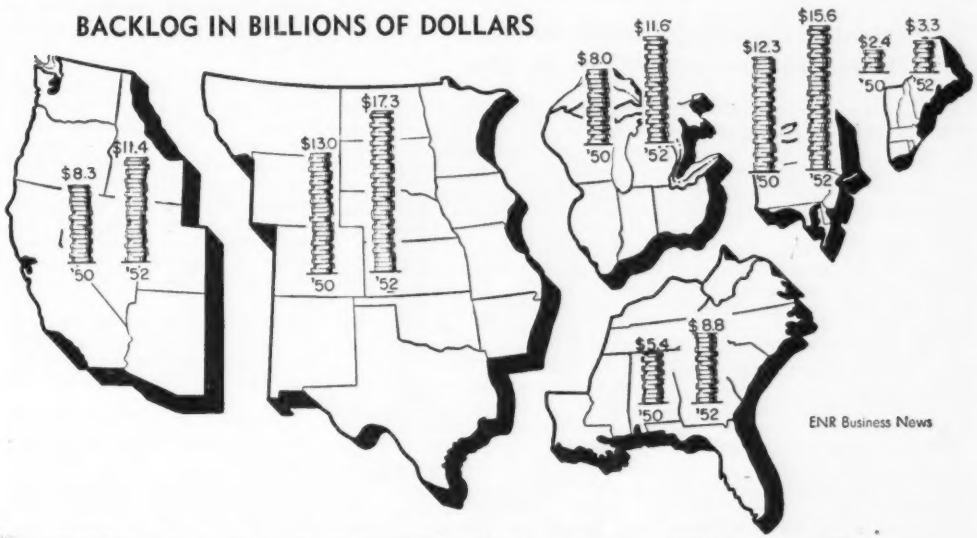
A steel plater girder superstructure will be placed on stonefaced concrete piers and abutments and footings will be spread on compact clay and gravel, 20 feet below the river bed. When completed, the four spans will have an aggregate length of 450 feet. The overall length of the bridge will be 552 feet and the average elevation of the roadway, 28 feet above normal water. The bridge is on a two degree horizontal curve with the rate of superelevation, 0.03. Forty-one degrees is the average skew of piers and abutments.

Skilled workers are to be paid $3.15 per hr and common labor, $1.75. The contractor is to furnish all material on this job, which is to start December 29, and be completed by July, 1954.

Bidders include:

1C Charles H. Tompkins Co., Washington, D. C.	$1,459,244
2 Peerless Constr. Co., New York, N. Y.	1,495,250
11 Lewis & Bowman, Inc., Goldsboro, N. C.	2,065,850

Bids: 11-6-52 Items	Unit	Quantity	Unit Prices 1 C	2
Road Work				
Clearing & grubbing	ac	0.25	$1,200	$400.00
Uncl exc for borrow	cy	24,000	1.80	2.00
Replacing topsoil	cy	200	6.00	4.00
Seeding	sy	20,000	60.00	15.00
Bridge				
Special uncl exc	cy	16,000	1.60	10.50
Uncl exc for struct	cy	9,000	28.00	15.00
Foundation fill	cy	10,000	2.40	5.00
Stone blk paved median	sy	300	24.00	18.00
CI AA conc	cy	9,200	46.50	48.00
CI S conc	cy	700	24.00	30.00
CI X conc	cy	100	48.00	50.00
Reinforcing steel	lb	1,100,000	0.13	0.12
Str stl, furn, fabr, erect	lb	1,700,000	0.20	0.18
Str stl (castings), furn, fabr, erect	lb	42,500	0.37	0.35
Str stl (railing), furn, fabr, erect	lb	30,000	0.58	0.35
Str stl (grey iron castings for scuppers), furn, fabr, erect	lb	500	0.50	0.35
CI A granite masonry in parapets	cy	30	230.00	250.00
CI A granite masonry facing for concrete	cy	380	190.00	175.00
Dimensioned masonry	cy	70	430.00	380.00
6" cast iron soil pipe	lf	160	3.70	5.00
Untreated timber piling	lf	12,000	2.00	4.00
Test piles	lf	200	9.00	15.00
CI frames and covers	pr	2	26.00	150.00
Damp-proofing	sy	100	1.25	2.00
4" fiber or met conduit	lf	1,200	2.50	3.00



ALL SECTIONS of the country shared in the $18.7-billion backlog increase from June, 1950 to November, 1952.

Proposed work piles up fast

New construction projects were proposed at a fast clip in November.

The backlog of proposed heavy construction, as reported by ENGINEERING NEWS-RECORD and the Construction Daily, climbed by $693 million in November. This gain came close to matching the two-month increase for September and October.

November's large volume of proposed work pushed the total backlog to a new high of $68.1 billion.

Nearly $6 billion in proposed construction has piled into the backlog in the first eleven months of this year.

• **Where the gains came**--New building projects were responsible for most of the November rise, racking up a $437-million gain in proposed work.

Industrial buildings accounted for nearly half of the increase, adding new projects with an estimated cost of $211 million. Every section of the country except New England reported a rise in the industrial building backlog in November; states west of the Mississippi had the largest gain—$79 million.

The backlog of proposed public buildings went up another $176 million in November, with all of the increase registered by states in the South or West.

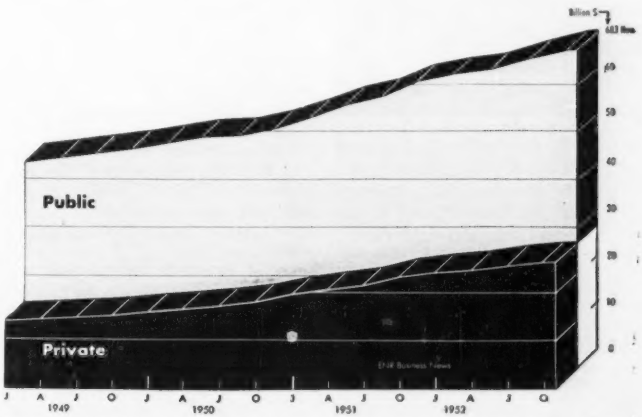
Commercial building and private mass housing together showed a small rise of $50 million in the backlog.

In heavy construction, sewerage work contributed $202 million to the swelling backlog. California was the big factor with an increase of $183 million.

A big gain came in the earthworks and waterways category. Proposed projects in this category contributed to a net rise of $126 million. Of that amount, $96 million involved the proposed widening of the Hudson River, from New York City to Albany.

The waterworks backlog turned up a small gain—$17 million—in November, while other public works, including highways, bridges and public unclassified work did not change much.

Private unclassified construction was the only category to show a drop. This type of construction, which is composed principally of pipelines and transmission lines, reported a drop of $107 million in its backlog.



ENR'S BACKLOG of proposed heavy construction climbed to $68.1 billion in Nov.

Some cities face cement rise

• Producers eager for price controls to end

• If lids stay, many will petition for hikes

Contractors in some sections of the country can expect to pay higher prices for cement in 1953 if controls die. And, if controls remain, a number of manufacturers will petition the Office of Price Stabilization for higher price ceilings.

This was the situation that turned up in an ENGINEERING NEWS-RECORD survey of cement manufacturers and dealers in major cities throughout the country.

Cement is now selling at—or close to—ceiling prices in every one of the 19 cities checked.

Producers have been reluctant to discuss higher cement prices for next year. But many said that they are faced with labor and fuel costs.

The plight of the producers has been accentuated by the fact that in all but a few cases they have not been able to raise prices for cement ever since price controls were clamped on in January 1951.

• Increases expected—Manufacturers in Dallas, Tex., and St. Louis, Mo., told ENGINEERING NEWS-RECORD that they will raise cement prices if price controls are lifted next year. In Chicago, producers with plants scattered throughout the country, said that the end of the excess profits tax would relieve the pressure for a price boost. But, if the tax remains, these producers said they definitely would ask OPS to increase ceiling prices in some areas.

In New York, a major producer said that cement prices will not change in the first quarter of '53. After that, the outlook is uncertain.

Cement manufacturers in Philadelphia, Pittsburgh, Cleveland, and New Orleans were wary of predicting price patterns in their cities because local conditions could affect the price outlook materially.

Other cities freely predicted that prices would remain stable. Manufacturers in Atlanta, Detroit, Denver and San Francisco, for example, foresaw no price changes for 1953.

In one of these cities, San Francisco, a producer said that he has not yet raised his cement prices although he received authorization from OPS some time ago. The market is competitive there. This explained the reluctance to boost the price.

• Shortages?—Dealers in several cities reported that they expect some shortages of cement to develop next year. Extensive roadbuilding was cited as the principal reason. In Ohio and Kentucky, huge construction programs of the Atomic Energy Commission were listed as reason for shortages.

Demand for cement will be great next year because another big year is expected for construction. Barring any serious strikes, it now appears that the cement industry will be able to meet the demand.

Both cement production and shipments pushed to new highs this year, despite strikes which cost an estimated 5,000,000 barrels of cement.

Local conditions affect the price and supply outlook.

In New York, for example, there may be spot shortages in '53. One reason, given by a major producer, was the large amount of cement needed for the New York State Thruway.

Philadelphia has had a cement shortage for almost four months. This was traced to heavy volume of construction and roadbuilding, and to the fact that some cement plants were closed down for varying periods while new wage contracts were being negotiated with labor unions. The shortage is easing now, as winter slows down the roadbuilding volume.

By careful shopping, contractors in Pittsburgh have been able to buy cement recently for below-ceiling prices, but in general, cement prices are staying close to the OPS level.

Baltimore dealers expect some shortages, and offer varying reasons. One felt that "cement manufacturers are asleep in failing to expand . . . and are behind times in their operations."

But a Baltimore producer said general shortages might result because highway and public works projects will take large quantities of cement next year. Another manufacturer added that cement has been rather short in Baltimore for the past two years.

Atlanta, Ga., contractors often wait one or two weeks for delivery of cement, but there is no chronic shortage. The outlook there is that the price of cement will remain relatively stable in '53—unless freight rates are increased again.

In Miami, Fla., where cement has been in short supply ever since the postwar building boom began, prices are expected to remain at their present levels throughout 1953.

• Easing in Kentucky—Cement producers in Kentucky are coming out of a period of shortages which had been critical, in some cases, during the summer and the fall months—until December. Now production is booming and cement men look for a healthy, strong market through 1953. Prices generally in Louisville are at the legal ceiling. There is mixed opinion on the price outlook for next year.

New Orleans, La., expects a cement shortage beginning in the spring. The city has just come out of one. Prices are at the OPS ceiling now, with little change expected.

Chicago is just recovering from a definite cement shortage, but doesn't expect another one. The shortage this year was aggravated by strikes at the cement mills, which resulted in heavy production losses.

Cleveland producers—with the AEC project at Portsmouth and the state of the Ohio Turnpike in mind—definitely expect a cement shortage to develop in the spring.

Manufacturers and dealers in Detroit said that there is now pressure for an increase in prices. The city goes through a cement shortage every August and September.

Prices are expected to remain steady in Milwaukee, Wis. Supply will be good except for the normal seasonal shortages in late summer.

Supply of cement should be ample in St. Louis, Mo., where two plants are located. But prices there can be expected to go up if ceilings are removed.

Kansas City, Mo., dealers are crossing their fingers. They faced a cement shortage this year—and said that '53 probably would be worse. Cement is selling at ceiling prices.

Cement supply is just tight enough in Dallas, Tex., to keep prices up, to keep small contractors scouting for cement—and sometimes paying over-ceiling prices—and to delay some jobs. Some Dallas homebuilders have formed a pool to buy cement by the carload from Kansas and Oklahoma. A price increase—dealers and manufacturers agreed is almost inevitable.

Denver, Colo., dealers said they were able to avoid a shortage even during the summer and do not expect one in '53. Prices are now at the ceiling level with no changes in sight.

San Francisco looks for no trouble

for some time. Both Calaveras Cement Co. and Permanente Cement Co. have increased their facilities; a two-month carpenters' strike this summer cut construction volume and eased the demand for cement; and the rainy season has started and will reduce building activity substantially until spring.

There has been no real shortage in Los Angeles, but a leading wholesaler-retailer said supplies are "uncomfortably low." It is expected that rainy weather will relieve the situation and give stocks a chance to build up. There appears to be little prospect of a price rise.

Seattle mills will be kept busy supplying the demand next year—but no shortages are expected. Cement is selling at ceiling prices.

City votes $1 million to attract industry

Despite adverse court rulings in some states in recent months which have dampened enthusiasm for municipally built industrial plants, this method of attracting industry is not yet dead.

The latest evidence came from Shelbyville, Tenn., which last week voted to issue $1-million worth of bonds to construct or acquire buildings to be rented to industry.

Bonds will be issued under an act of the 1951 legislature which authorized cities to construct or acquire buildings and sites and lease them to new industries or local industries that wanted to expand. Rents from the industries would be used to retire the bonds.

• **Private plan**—Meanwhile, plans for the formation of a privately financed, privately managed industrial development corporation in Rhode Island were announced by a group composed of the state's top businessmen and bankers.

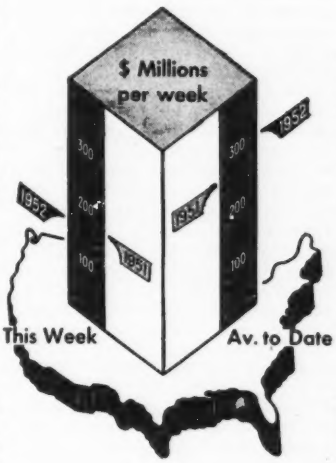
Designed to increase and expand industrial plant facilities and employment opportunities, the Rhode Island corporation is expected to follow similar industrial development corporations now functioning in Maine and New Hampshire.

As in Maine and New Hampshire, sponsors of the Rhode Island plan hope to obtain legislation that would permit banks, insurance companies and other lending institutions to make available—on call—a percentage of their capital funds.

The legislation would also place the corporation under the supervision of the state's bank commissioner.

Activity This Week

As reported to ENR (in millions of dollars)



Contracts by type of work

	This Week*	Cumulative 52 wks 1952	1951	% chge
Waterworks	$11.2	$231.1	$208.9	+11
Sewerage	4.3	304.3	344.6	−9
Bridges	4.8	413.9	315.8	+31
Highways	5.1	1,396.1	1,167.2	+20
Earthwork, waterways	18.0	495.8	504.5	−2
Buildings:				
Public	9.7	4,292.4	2,057.3	+109
Housg., pub.	3.7	606.5	644.0	−6
Housg., priv.	36.7	3,001.9	2,032.4	+48
Commercial	16.2	843.4	599.8	+41
Industrial	30.9	2,722.3	4,123.9	−34
Unclassified	13.9	1,381.6	1,617.0	−15
Total	**$154.5**	**$15,689.3**	**$13,605.4**	**+15**

NOTE: Minimum size projects included are: Waterworks and waterway projects, $24,000; other public works, $60,000; industrial buildings, $82,000; other buildings, $300,000.

* 3-day week

ENR indexes		Base Year = 100 1913	1926	1949
Constr. cost.	Dec.	587.49	282.41	123.16
	Nov.	588.61	282.94	123.39
Bldg. cost.	Dec.	425.26	229.88	120.88
	Nov.	426.04	230.30	121.10
Volume	Nov.	504	205	146

County building contract creates dissension

Another battle over a contract looms in Los Angeles, this time on the county level.

At stake is lease-purchase agreement for a $3-million building which is to house the County Charities Department.

The county Board of Supervisors last July approved a contract with G. Harvey Mydland Co., realty-investment firm, for the charities building, with a 20-year lease at $20,300 a month and an option to buy at the end of the period for $540,000. The board gave its approval of final plans in late November.

Newly elected supervisor Kenneth Hahn reversed the 3-2 majority favoring the agreement. Declaring that Mydland was getting too much profit out of the county's taxpayers, he asked (Dec. 9) the county counsel to figure out a legal way of breaking the contract.

The six-story building was designed by architect James E. Friend and engineer George V. Novikoff. It will house offices now doing business in one county-owned building and two rented ones (total rental under the present arrangement is given as $90,000 a year).

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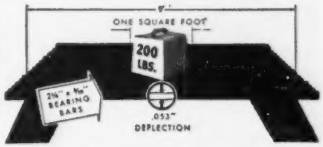

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New financing plan outlined for Northwest power projects

Power projects in the Pacific Northwest can be developed in an orderly manner—without depending on congressional appropriations, through sale of revenue bonds.

That was the theme developed last week at a meeting of the Bonneville Regional Advisory Council in Seattle, Wash.

Revenue bond financing would avoid some of the headaches that have come in the past because it would provide funds when they were needed and not at the mercy of Congress. And, it logically could lead to greater local representation on the commission or agency that sold the revenue bonds.

The idea itself is not new. But the source of the suggestion last week offered something of a surprise. Paul J. Rover, Bonneville Power administrator, offered the new proposal.

Sen. Guy Corden, Oregon Republican, has been considering something similar. He might ask Congress to set up some kind of regional corporation with directors to be appointed by governors of the Columbia River Basin states.

There has been a great deal of opposition in the area to plans for a Columbia River Valley Authority, but the new plan would overcome the major objections. First, although owned by the federal government, the projects would not be dependent upon appropriations. Second, under the Corden Plan, local representation would be assured.

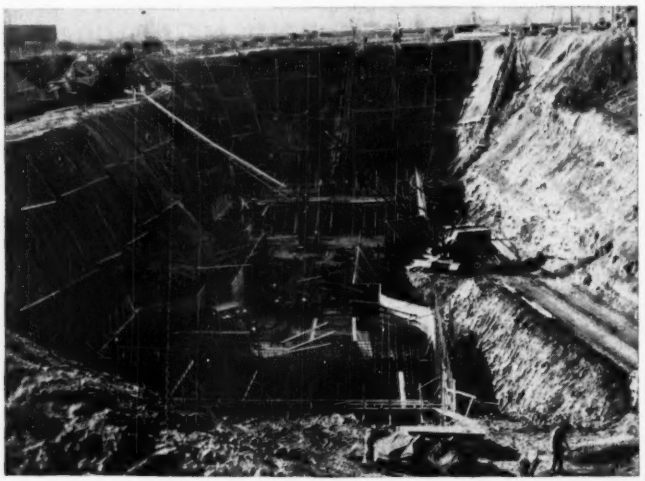
No detailed legislative plan was offered last week. But such a regional power commission probably would step into the picture this way:

- Congress would pass legislation setting up a regional corporation—and following the Corden Plan for staffing the new organization.
- The new corporation would operate present facilities. When a new facility was needed—a steam plant, for example—the power corporation would sell revenue bonds. These bonds might be sold in the open market—or they might be purchased by the RFC.

- **Flood control, navigation**—The plan still presents problems. There is some question about flood control and navigation and how these would fit into the plan, because they are "non-reimbursable" items.

The suggestion has been made that there could be two top agencies—one to handle power, and the other to provide for other phases of river development.

These are matters which local interests—and Congress—must decide.



FOUNDATION PIT seven stories deep and covering more than an acre of ground will accommodate the Air Force's 35,000-ton and 25,000-ton aluminum forging presses scheduled for installation at Newark, Ohio. To accommodate these giant presses, contractor Darin and Armstrong, Inc., of Detroit, excavated about 104,000 cu yd of earth.

OFFICIAL PROPOSALS

Bids: January 6, 1953

Construction of Five Piers and Two Abutments

Sealed proposals will be received by the West Virginia Turnpike Commission for:

CONTRACT NO. 12

The work to be done under this Contract consists generally of the construction of the five piers and two abutments for the Fourmile Fork Bridge between Station 1420+00 and Station 1432+65 near Standard in Kanawha County, West Virginia, all in connection with the construction of the West Virginia Turnpike in the State of West Virginia.

The principal items of work include:

	Approximate Quantity
Excavation	4,100 cu. yds.
Concrete	2,860 cu. yds.
Reinforcing Steel	193,000 lbs.

Proposals will be received at the office of the West Virginia Turnpike Commission, 1340 Wilson Street, Charleston 5, West Virginia until 9:00 A.M. Eastern Standard Time, and thereafter at the Woman's Club of Charleston, Virginia and Elizabeth Streets, Charleston, West Virginia until 10:00 A.M. Eastern Standard Time, on January 6, 1953, at which time and place said proposals will be publicly opened and read.

Contract documents may be seen and may be inspected by prospective bidders during office hours, after December 12, 1952, at the office of Howard, Needles, Tammen & Bergendoff, 804 Greenbrier Street, Charleston, West Virginia and 55 Liberty Street, New York 5, N. Y.

Contract plans and specifications will be furnished for Fifteen Dollars ($15.00) for each set, which is not refundable, upon application to Howard, Needles, Tammen & Bergendoff, 804 Greenbrier Street, Charleston, West Virginia. (Mailing address P. O. Box 5266, Charleston, W. Va.). Make checks payable to Howard, Needles, Tammen & Bergendoff.

Proposals must be made upon the proposal forms furnished by the Commission in the manner designated in the Specifications, and must be enclosed in sealed special addressed envelopes bearing the name and address of the bidder and the number of the contract on the outside, and must be accompanied by a CASHIER'S or CERTIFIED CHECK or PROPOSAL BOND in favor of the West Virginia Turnpike Commission FOR NOT LESS THAN FIVE (5) PER CENT OF THE AMOUNT OF THE PROPOSAL, but not less than $500.00 nor more than $200,00.00 and must be delivered at the place designated above on or before the day and hour named. Copies of the proposal form and proposal bond form to be used for submitting proposals, and of the special addressed envelope are furnished in detached form with the contract documents.

The contract will be awarded or the proposals rejected within thirty (30) days from the date of opening proposals. The right is reserved to reject any or all proposals, and to waive any or all formalities.

WEST VIRGINIA TURNPIKE COMMISSION
D. Holmes Morton, Chairman

December 5, 1952

U. S. Government

UNITED STATES DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-3858) will be received by Bureau of Reclamation, Huron, South Dakota, until January 15, 1953, and then publicly opened for furnishing all labor and materials and performing all work for the construction of 115-kv, 3-phase, single-circuit, wood-pole, H-frame type transmission lines, as follows: Two parallel lines, each approximately 11 miles long; and two parallel lines, each approximately 1.7 miles long. Award will be made for the entire work to be done. The work is situated in the vicinity of Fort Randall Dam, South Dakota. Time allowed for completion will be 300 days. For particulars, address Bureau of Reclamation, Huron, South Dakota; or Building 53, Denver Federal Center, Denver, Colorado.

OFFICIAL PROPOSALS

Bids: January 3, 1953

Grading, Drainage, Construction of Structures and Paving

OHIO TURNPIKE COMMISSION
361 East Broad Street
Columbus 15, Ohio
Contract No. C-1

Sealed proposals will be received by the Ohio Turnpike Commission for the performance of Contract No. C-1. The work covered by this contract consists generally of the construction of grading, drainage, structures, and paving of approximately 5.2 miles of the Ohio Turnpike beginning at a point about 500' east of South Range-Center Road at Turnpike Centerline Station 1015+00 in Mahoning County, Ohio and extending eastwardly to the Ohio-Pennsylvania State Line at Turnpike Centerline Station 1292+03.83 in Mahoning County, Ohio, and the construction of engineer's office buildings and facilities on or near the site of the work. The principal structures to be built are three reinforced concrete culverts and five steel-beam bridges of from three to five spans each, supported on reinforced concrete abutments and bents. The abutments for four of these bridges are to be on steel piles and for the other bridge on spread footings. The bents are all to be on spread footings.

Approximate quantities of the major items for said construction are as follows:

Roadway Excavation	1,175,400 cu. yds.
Borrow	67,000 cu. yds.
Structural Concrete	6,000 cu. yds.
Reinforcing Steel	867,000 lbs.
Fabricated Structural Steel	1,256,000 lbs.
10" Reinforced Concrete Pavement	147,000 sq. yds.

Copies of the Plans, Specifications, and all other Contract Documents for said contract will be available for public inspection or purchase at the office of the chief engineer, Ohio Turnpike Commission, 361 East Broad Street, Columbus 15, Ohio, not later than December 19, 1952. On or after the aforesaid date, these documents may be purchased from the chief engineer of the Ohio Turnpike Commission for the following sums, which sums are non-returnable:

General Specifications, per set	$5.00
Plans, including soil profiles and boring logs, and other Contract Documents (excluding General Specifications), per set	15.00
Cross Sections, per set	25.00

All proposals must be on the form prescribed by the Commission and must comply with the terms and conditions set forth in the Contract Documents.

Each proposal must be accompanied by a certified check on a solvent bank, payable to the order of the Ohio Turnpike Commission, in an amount not less than 5% of the total amount bid in said proposal. Said certified check will be held by the Commission as a guarantee that, if the proposal is accepted, a contract will be entered into and the performance of the proposal will be secured.

All bids must be received on or before 10:00 o'clock A. M., Eastern Standard Time, January 3, 1953, in the offices of the Ohio Turnpike Commission, 361 East Broad Street, Columbus, Ohio.

Immediately after the closing of bids, the bid box will be removed to the Neil House Hotel, 41 South High Street, Columbus, Ohio, where the bids will be publicly opened and read.

The award of the contract, if it be awarded, will be to the lowest and best bidder whose proposal complies with all prescribed requirements. The Commission reserves the right to reject any and all proposals and to waive technicalities.

DATED December 10, 1952

OHIO TURNPIKE COMMISSION

CD —12(11)-(19)-(26)52
YV —12(12)-(19)52
Eng News-Rec.—(18)-(25) 52

Spec. SM-50

NOTICE TO CONTRACTORS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 A.M., Eastern Standard Time, on December 30, 1952 by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y. for

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON THE PALISADES INTERSTATE PARKWAY, GOSHEN, HARRISON, (ROUTE 32) TO OXFORD, (ETC.) ORANGE COUNTY, WHICH CONSTITUTES CONTRACT NO. SPEC. SM-50.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, N. Y.
(b) J. S. Bixby, District Engineer, Pleasant Valley Road, Poughkeepsie, N. Y.
(c) Charles Schaefer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. A refund in full will be made to bidders for return of one set in good condition within 30 days of award or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

The Engineer's estimate of cost for this work is $29,775.00.

Proposal for this contract must be submitted in a separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1,490. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instruction to Bidders".

The right is reserved to reject any or all bids.

B. D. TALLAMY,
Superintendent of Public Works

Bids: December 30, 1952

Gasoline-Engine Generator Sets

CONTRACT 437

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 11:00 A.M., Eastern Standard Time, on Tuesday, December 30, 1952, for Contract 437, for furnishing, testing, delivering and unloading gasoline-engine generator sets with switchgear and appurtenances for the West Branch and the Kensico South effluent chambers of the Delaware Aqueduct, all as set forth in the specifications.

No bid will be received and deposited unless accompanied by a certified check upon a National or State bank, drawn and made payable to the order of the Comptroller of The City of New York, in the amount of two thousand dollars ($2,000.00), for the proper execution of the contract.

At the above place and time the bids will be publicly opened and read. Pamphlets containing information for bidders, forms of bid and contract, specifications, requirements as to surety, etc., can be obtained in Room 1316 at the above address, upon application in person or by mail, by depositing the sum of five dollars ($5.00) in cash or its equivalent for each pamphlet. Within 30 days following the award of contract or rejection of bids, the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of four dollars ($4.00) will be made for each other pamphlet returned in acceptable condition. For further particulars, apply at the office of the Chief Engineer at the above address.

IRVING V. A. HUIE, President, RUFUS E. McGAHAN, EDWARD C. MAGUIRE, Commissioners, Board of Water Supply; BETTY COHEN, Acting Secretary.

Bids: January 9, 1952

Construction of a Superstructure

JACKSON COUNTY, MISSOURI
CLAY COUNTY, MISSOURI
MISSOURI RIVER BRIDGE
AT THE PASEO
KANSAS CITY, MISSOURI

December 12, 1952

1. Sealed bids will be received until 2:00 P.M., C.S.T., January 9, 1953, at the Court Room, Jackson County Court House, 12th and Oak Streets, Kansas City, Missouri, and then publicly opened, for construction of superstructure of the above named bridge, in accordance with the specifications, drawings and addenda.

2. The work for which bids are requested includes superstructure metal work, cables and suspenders, concrete deck and completion of concrete shafts of two river piers, with the following approximate principal quantities: Carbon Steel, 1900 tons; Silicon (or Low-Alloy) Steel, 4100 tons; Castings, 160 tons; Cables and Suspenders, 350 tons; Concrete Deck, 2400 cu. yd.; Pier Concrete, 820 cu. yd.; Reinforcing Steel, 320 tons; Open Grating, 9000 sq. ft.; Handrail, 3650 lin. ft.

3. Each bid shall be accompanied by a cashier's or certified check in an amount not less than five per cent of the total amount of the proposal. Bids and cashier's or certified checks may be held for a period of not more than sixty days after the date of opening; thereafter cashier's or certified checks will be returned to bidders.

4. All work except painting is to be completed within 450 calendar days after receiving notice to proceed, with completion of painting within 90 additional calendar days. Delays must be compensated by liquidated damages; performance bond will be required.

5. Copies of plans and specifications are on file and may be examined at the office of the Consulting Engineer, Howard, Needles, Tammen & Bergendoff, 921 Walnut Street, Kansas City, Missouri, or 55 Liberty Street, New York, New York. Prospective bidders will be supplied with one set of plans and two copies of the specifications upon depositing $50.00 with the Consulting Engineer, Kansas City Office, of which $35.00 will be refunded to successful bidders, and to others upon return of the documents. Prospective bidders may secure extra prints of plans at 50 cents per sheet and extra copies of specifications for $2.00 per copy.

6. Bids containing escalation and redetermination clauses will not be considered. The Owner reserves the right to reject any and all bids and to make the award without technicalities as to procedure.

7. Before award of contract on this project is made, the Contractor shall submit to the Owner satisfactory evidence that he has a definite commitment as to price and delivery of structural steel, cast steel, cable wire and reinforcing steel. The Owner will arrange for allotment of controlled materials to this project.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
Consulting Engineers
921 Walnut Street
Kansas City, Missouri

Notice to Contractors: Commonwealth of Massachusetts, Department of Public Works, sealed bids or proposals will be received by the Department of Public Works at its office, Room 526, Fifth Floor, 100 Nashua Street, Boston, Mass. until 12 o'clock noon, Monday, December 29, 1952 immediately after which proposals will be publicly opened and read at the Fourth Floor. The work to be done consists of Hydraulic Dredging and Bank Restoration at Merrimack River Entrance, Salisbury Beach Reservation, Salisbury. Charge for specifications is $5.00 which amount is returnable only to bidders. Proposal guaranty shall consist of a certified check for $3,000.00 payable to the order of the Department of Public Works or other security satisfactory to the Department. A bid bond will not be accepted. The successful bidder will be required to furnish a bond for the faithful performance of the contract in such sum as may be fixed by the Department. The surety may be a surety company or securities satisfactory to the Department. Attention is called to the minimum rate of wages to be paid on the work as determined by the Commissioner of Labor and Industries under the provisions of Chapter 461 of the Acts of 1935. Complete information may be obtained from the office of the Department. Right reserved to waive any informality in or to reject any or all proposals. A proposal which includes for any item a bid that is abnormally low or high may be rejected as unbalanced. By: William F. Callahan, Commissioner of Public Works, December 13, 1952.

Bids: January 21, 1953

Construction of Water Mains

SECTION 1
NOTICE TO BIDDERS
PROPOSED WATER MAINS AND APPURTENANCES
CONTRACT NO. WI-5-52W
FRUITLAND AND VICINITY
WICOMICO COUNTY, MARYLAND

Sealed bids for the construction of proposed water mains and appurtenances will be received by the Wicomico County Water and Sewer Authority at the office of The County Commissioners of Wicomico County located in the Court House, Salisbury, Maryland until 2:00 P.M., EST, Wednesday, January 21st, 1953, at which place and time the bids will be publicly opened and read.

(Continued on page 68)

OFFICIAL PROPOSALS
(Continued from page 67)

The principal materials involved are approximately as follows:

BASE BID: 40,960 L.F. of 6" through 12" B&S Class 150 C.I. pipe, 21 Tons of B&S Class D.C.I. fittings, 123 6" through 12" hub-end gate valves with valve boxes, 48 hub-end fire hydrants, 84 L.F. of 12" Class 150 mechanical joint C.I. pipe under railroad tracks, 2100 L.F. of 2" G.S. pipe with necessary valves and fittings, 9310 L.F. of ¾" and 1" G.W.I. service connections, 525 lead goosenecks with corporation stops, 560 curb stops with service boxes, 30 meters complete with boxes, and 8760 sq.yds. of various types of roadway replacement.

ALTERNATE ITEMS: 41,110 L.F. of 6" through 12" Class 150 mechanical joint C.I. pipe, 15 Tons of Class 250 mechanical joint C.I. fittings, 123 6" through 12" gate valves with mechanical joint ends, and 48 fire hydrants with mechanical joint bases, all complete with accessories.

Contract Documents including Specifications may be examined at the office of Herman E. Perdue, Secretary to the Authority, located in the Odd Fellows Building, East Main Street, Salisbury, Maryland or copies obtained from Clarke Gardner and Percy Sterling, Consulting Engineers, Calvert and Bond Streets, Salisbury, Maryland upon deposit of Fifteen Dollars ($15.00) for the first set which will be refunded in full to all bona fide bidders, and Ten Dollars ($10.00) for each additional set which will not be refunded.

Contractors shall submit a proposal on both the Base Bid and the Alternate Bid. Each bid shall be accompanied by a certified check or bid bond made in favor of the Wicomico County Water and Sewer Authority in an amount not less than five (5) percent of the Base Bid or the Alternate Bid, whichever is less.

No bidder may withdraw his bid within thirty (30) days after the actual date of the opening of bids.

The Authority reserves the right to consider informal any bid not prepared and submitted in accordance with the provisions of the contract documents and may waive any informalities in or reject any and all bids.

WICOMICO COUNTY WATER AND SEWER AUTHORITY
Calvin H. Cropper, Chairman
Herman E. Perdue, Secretary

December 3rd, 1952

Bids: January 13, 1953

Construction of a Snack Bar

THE PORT OF NEW YORK AUTHORITY
NEW YORK INTERNATIONAL AIRPORT
SECOND FLOOR SNACK BAR
TEMPORARY TERMINAL BUILDING
CONTRACT NYA-160.032

Sealed proposals for the construction of a snack bar on the second floor of the Temporary Terminal Building at New York International Airport will be received at the office of the Chief Engineer of The Port of New York Authority, Room 1100, 111 8th Ave., New York 11, until 2:30 P.M., Tuesday, January 13, 1953, at which time and place said proposals will be opened and read.

Contract documents may be seen at the office of the Engineer of Materials, Room 1110, Monday, December 29, 1952, and copies will be furnished upon deposit of $25 per set. Deposit to be delivered to the Treasury Department, Room 1001, where a receipt in duplicate will be issued. A copy of the receipt should then be delivered to the Engineer of Materials who will furnish the contract documents. The deposit will be remitted if the documents are returned in good condition, not later than 30 days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
Howard S. Cullman, Chairman

New York, December 25, 1952

CONTRACTORS WATCH THIS SECTION

for New Projects

Publish your announcements thru the "Proposal Section" of Engineering News-Record and get their bids.

OFFICIAL PROPOSALS

Bids: December 30, 1952

New York State Road Work

NOTICE TO CONTRACTORS: STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of the Highway Law, and Article 2, Title 9 of the Public Authorities Law, and special provisions for projects financed with Federal Aid funds, sealed proposals will be received until ten-thirty o'clock A.M., eastern standard time on the 30th day of December, 1952, by Henry A. Cohen, Director, Bureau of Contracts and Accounts, 14th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for the following projects:

County	Contract No.	Name	Miles	Type	Deposit	Estimated Cost of Work
		DISTRICT No. 1				
		G. L. Nickerson, District Engineer, 353 Broadway, Albany, New York				
Schenectady	M. T. 52-18 S. T. 52-35 R. C. 52-123	New York State Thruway-Mohawk Sect., Subd. 1 (Mont. Co. L. Gregg Rd.) Co. Rd. 29R; Crawford Rd.; Gregg Rd.; Camp Patterson-ville Rd.; Rotterdam Water Tower Access Rd.; Patterson-ville Scotch Church S. H. 1482	Thy. 4.77 Acc. 1.50	9" Cem. Conc. Pavt. 2 @ 25' Wide=4.77 Mi. Bit. Mac. Ty. 1=1.07 Mi. Found. Cse. Grav.=0.43 Mi. Gr. Sep. Alpha I-Beam 145.3' Gr. Sep. Alpha I-Beam 227' Gr. Sep. Rigid Fr. 31' Alpha I-Beam Bridge 51.8' Conc. Twin Box Bridge 24'	$244,000 Plans $100	$4,428,000
		DISTRICT No. 3				
		William Robinson, District Engineer, Weigh Lock Bldg., Syracuse, New York				
Cayuga & Onondaga	O. T. 52-21P	New York State Thruway-Ontario Section, Subd. 5A, 5B (Port Byron-Jordan); Weedsport Interchange	Thy. 6.52 Acc. 1.33	9" Cem. Conc. Pavt. 2 @ 25' Var. Wide=7.82 Mi. Found. Cse. Grav.=0.03 Mi. Gr. Sep. Alpha I-Beam 206.6'	109,000 Plans $25	1,989,000
		DISTRICT No. 4				
		J. P. Larsen, District Engineer, Barge Canal Terminal, Rochester, New York				
Monroe	O. T. 52-24 R. C. 52-121	New York State Thruway-Ontario Sect., Subd. 8B&9 (Rochester So.-Route US 15 Interchange); West Henrietta-Rochester S. H. 62	Thy. 2.52 Acc. 0.77	9" Cem. Conc. Pavt. Var. Wide=3.22 Mi. Found. Cse. Grav.=0.03 Mi. Grading=0.04 Mi. Gr. Sep. Alpha I-Beam 210'	35,000 Plans $15	637,000
		DISTRICT No. 7				
		C. C. Cassel, District Engineer, 444 Van Duzee St., Watertown, New York				
Franklin	FARC 52-118 R. C. 52-119	Saranac Lake Village: Broadway & River Sts. S. H. 1222 Saranac Lake-Lake Clear Junction Pt. 1 S. H. 1090 Proj. U-644(3)	1.80	Asph. Conc. Ty. 1A Opt.	16,000 Plans $10	231,000
Jefferson	FAC 52-17	West Main St.: City of Watertown Proj. U-1106(1)	0.75	Asph. Conc. Ty. 1A Opt.=0.71 Mi. Misc. Work=0.04 Mi.	20,000 Plans $15	386,000
		DISTRICT No. 10				
		J. J. Darcy, District Engineer, Montauk Highway, Babylon, Long Island, New York				
	FAMDE 52-5	Major Deegan Expressway Contract 6 Project U-1082(12)	1.29 Exp. 0.28 Acc.	Grading Drainage & Misc. Work = 1.29 Mi. Sheet Asp. Pavt. = 0.12 Mi. Cem. Conc. Pavt. = 0.16 Mi. Hy. Sep. Alpha I-Beam 119.69' Hy. Sep. Alpha I-Beam 98.55'	415,000 Plans $100	7,505,000
Bronx	FAMDE 52-6	Major Deegan Expressway (Contract 13) (Interchang at Grand Concourse) Proj. U-1082(6)	1.22	Granite Block Pavt=0.19 Mi. 9" Cem. Conc. Pavt. 2 @ 32' Wide=0.88 Mi. Misc. Work=0.15 Mi. Gr. Sep. Alpha I-Beam 167'	100,000 Plans $50	1,750,000

Maps, plans, specifications and proposed forms may be seen and obtained at the office of the State Department of Public Works, Bureau of Contracts and Accounts, Albany, N. Y., and at the office of the District Engineers noted above, and may also be seen at the office of the State Department of Public Works, 270 Broadway, New York City.

The deposit for Plans and Proposal Forms for each contract is indicated above. A refund will be made in full to bidders for return of one set, in good condition, within 30 days of award, or rejection of bids; refund for all other sets in good condition, similar period, will be 50% of deposit.

Special attention of bidder is called to "General Information for Bidders" in the proposal, specification, and contract agreement, and to the special provisions applying to projects financed with federal funds. Award of a contract is subject to the "Controlled Materials Plan" of the National Production Authority as well as to regulations issued thereunder.

Proposal for each contract must be submitted in a separate sealed envelope with the name and number of the contract plainly endorsed on the outside of the envelope. Each proposal must be accompanied by draft or certified check payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum or specified in the advertisement and the proposal. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law, as set forth in "Instructions to Bidders."

When optional types are permitted on contracts with federal funds bidders must state in the space provided in the proposal the exact designation of the optional type upon which the proposal is predicated.

The right is reserved to reject any or all bids.

B. D. TALLAMY
SUPT. OF PUBLIC WORKS

U. S. Government

SEALED BIDS WILL BE RECEIVED IN THE OFFICE OF THE ENGINEERING AND CONSTRUCTION DIRECTOR, PANAMA CANAL COMPANY, BALBOA HEIGHTS, CANAL ZONE, until 10:00 A.M. EST January 20, 1952 for furnishing all plant, tools, equipment, materials, labor and services, and for performing all work for construction of buildings and appurtenances and alterations to existing building, for Paradise School at Paraiso, Canal Zone, to be constructed by contract for the Canal Zone Government. Plans and specifications may be obtained from Purchasing Agent, Panama Canal Company, 24 State Street, New York 4, N. Y. Requests should be accompanied by a $30.00 deposit for each set of data. Deposit should be in form of U. S. money order or a certified check made payable to "Treasurer, Panama Canal Company".

Specifications and drawings may be inspected at the following offices:

Panama Canal Company, 101 Indiana Ave., N. W., Washington 25, D. C.

Panama Canal Company, 24 State Street, New York 4, N. Y.

Office of the District Engineer, U. S. Engineer's Office, 1709 Jackson Street, Omaha 2, Nebraska.

Office of the District Engineer, U. S. Engineer's Office, 4735 E. Marginal Way, Seattle 4, Washington.

Office of the District Engineer, U. S. Engineer's Office, Foot of Prytania Street, New Orleans, Louisiana.

Office of the District Engineer, U. S. Engineer's Office, 180 New Montgomery Street, San Francisco 19, California.

Office of the District Engineer, U. S. Engineer's Office, 751 S. Figueroa Street, Los Angeles, California.

Office of the Division Engineer, U. S. Engineer's Office, Southwestern Division, 1114 Commerce Street, Dallas, Texas.

Office of the District Engineer, U. S. Engineer's Office, P. O. Box 1538, Albuquerque, New Mexico.

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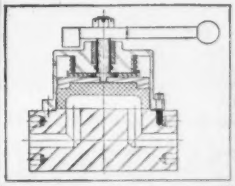

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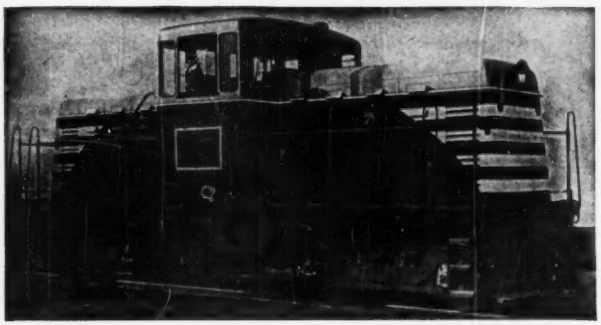

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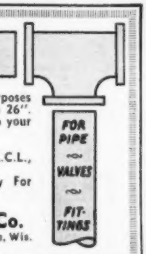

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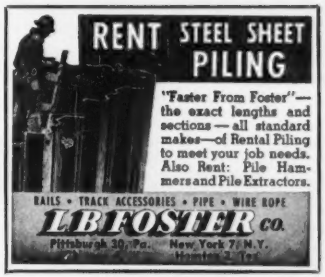
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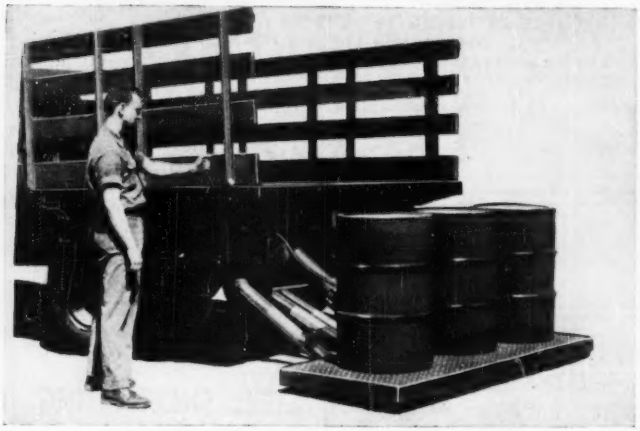


Hydraulic lift tailgate for any truck

A new hydraulic end-loader for all makes of motor trucks has been announced by Galion and called the "LOAD-evator". The unit is available in four models with loading space of 28x84 in. to 34x90 in. Models are adaptable to all trucks of 1½-ton size and over. The load capacity is 2,000 lb.

Power for the hydraulic tailgate operation is supplied direct from the truck engine through a transmission-mounted power take-off. This activates a Galion hydraulic hoist which lifts or lowers the end gate as desired. Action is controlled by a single spring-loaded lever which assures constant, positive, safe operation. Heavy tubular lift arms with built-in overload capacity are another important safety factor. THE GALION ALLSTEEL BODY COMPANY, GALION, OHIO.

Hough road sweepers are traction- or engine-powered

Since taking over distribution and manufacture of Hough road sweepers, the Meili-Blumberg Corp has developed a new line of improved models including tractor-mounted sweepers as well as pull types—both traction-and engine-powered.

Most recent is the 53M pull-type, powered by a Wisconsin VE4 engine. The 30-in. dia brush is 96 in. long and can be set at an angle of 30 deg to sweep a 78-in. path to right or left. A hydraulic powered ram lifts and lowers the brush and locks it high for fast trailing speeds. A balance spring on the frame enables the brush to float over uneven surfaces. Brush is set for 140 rpm but can be varied with engine speed. A sprinkler attachment is optional. MEILI-BLUMBERG CORP., NEW HOLSTEIN, WISCONSIN.

Presdply is combination of Presdwood and plywood

Masonite Corp. is now producing Presdply, a special panel with faces of Presdwood sandwiching a plywood core. It's available in 4x8-ft panels in thicknesses of ¼, ⅜ and ½ in. Two grades are manufactured; interior and exterior. Because Presdwood is grainless, the surfaces can be treated with paint, enamel, lacquer, shellac and varnish; because of the plywood core the material can be sawed, shaped, rabbeted, routed, drilled, nailed or glued. MASONITE CORPORATION, 111 W. WASHINGTON, CHICAGO, ILL.

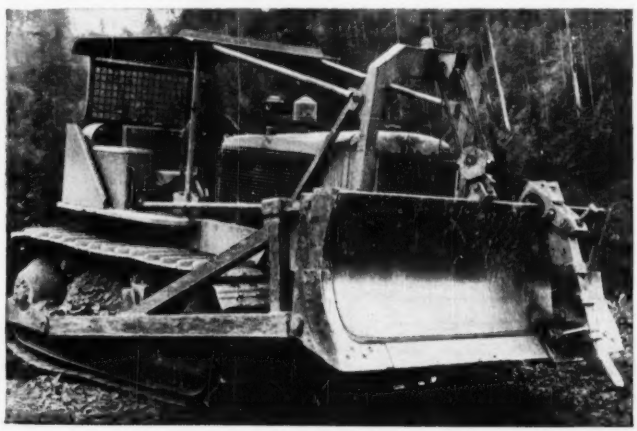
Adjustable rooter shank fits every size bulldozer

The heavy-duty tooth shank housing shown here mounts on the moldboard of a bulldozer by means of a special clamp used in combination with adapters and saddles to enable it to fit most popular makes of heavy-duty dozers. The rooters shank has four adjustments of ripping depths below the dozer's cutting edge and is equipped with ESCO box type replaceable points. Rooters can be attached in pairs or used singly as shown here on the dozer.

According to the manufacturer one of its principal advantages is that it enables the operator to rip, root, and doze at the same time. No special equipment is needed to mount or demount it from the dozer and it can be carried from job to job in a pickup truck or on the machine itself.

In tests and demonstrations it has excelled at boulder and stump removal, land clearing, ditch work, tearing up old pavement, ripping and handling overburden or cutting scamy rock. Its official name is the ESCO Buck Forte dozer-rooter, and is available from ELECTRIC STEEL FOUNDRY COMPANY, 2141 N. W. 25TH AVENUE, PORTLAND 10, OREGON.

(*Continued on page 81*)



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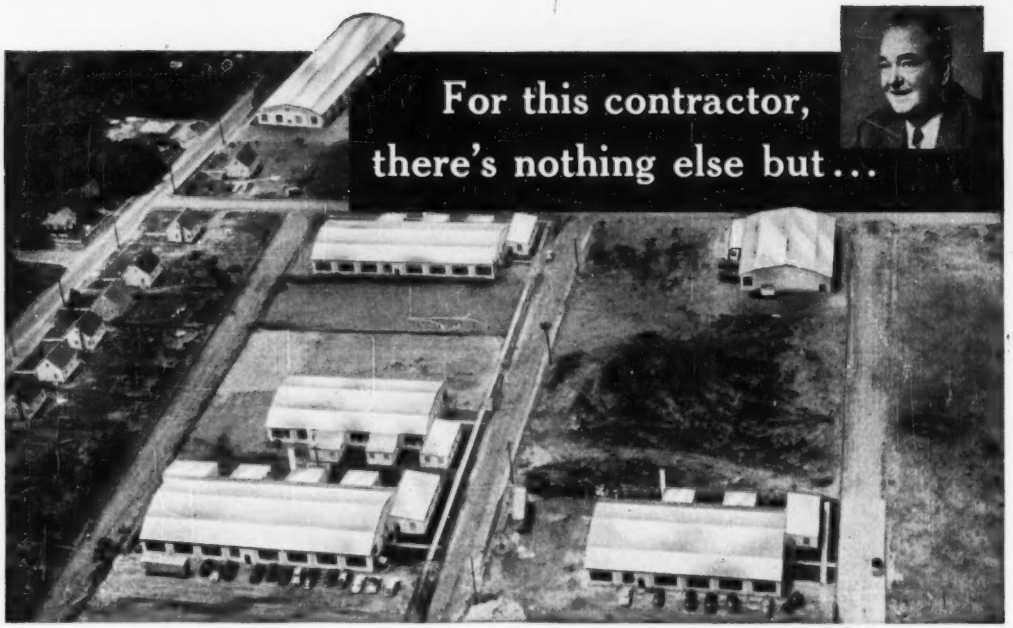

George Mole has been a contractor and industrial building owner in the Amityville, Long Island, area for 25 years. He discovered Reynolds *Lifetime* Aluminum Industrial Corrugated in 1949. He put his first 15,000 square feet on the Amityville School... then used it on the Copiague and Lindenhurst schools and on 13 other industrial and commercial buildings. Let him tell you why:

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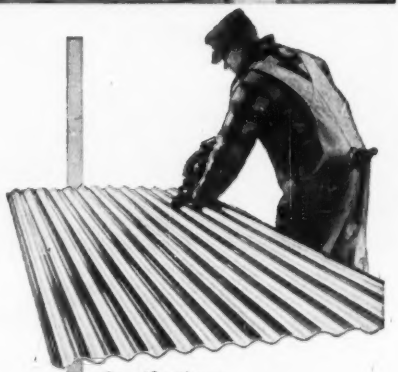

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Tucker Sno-Cats glazed with Plexiglas

Tucker Sno-Cats, such as the one pictured here are four-crawler-equipped vehicles employed in some of the wildest parts of the country by utilities, mining and lumbering firms, government agencies, ski resorts, and by search-and-rescue teams. In such operations, windows get rough treatment as work crews stow their equipment and slam doors. Windows are constantly struck by branches, too, and are exposed to temperatures far below zero. Breakage of windows in such conditions can mean discomfort and possible danger to occupants.

Accordingly the company has adopted shatter-resistant Plexiglas for its sliding side windows and for the large window in the hinged rear door.

The plastic panels are .150 in. thick and their light weight is in keeping with the entire design of the Sno-Cats. This design permits the machine, equipped with four pontoons, to climb a 65-percent grade in snow and to carry a load of men and equipment with ground pressure less than one pound per square inch—less than that of a man on skis.

The acrylic sheet has demonstrated its ability to withstand twisting stresses set up in window and door frames on the machines as they negotiate rough terrain. ROHM & HAAS COMPANY, WASHINGTON SQUARE, PHILADELPHIA 5, PENNSYLVANIA.

Bow saw made by Disston has 9-hp, 25-in. bite

Several new developments in chain saw design are said to be offered for the first time in one tool, a free-flow bow saw announced by Disston. In field tests made throughout the United States the new machine cut through seasoned 17-in. beech logs at the rate of better than 1 in. per second.

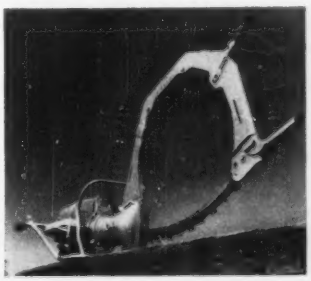
Instead of riding around the groove of an oval steel rail, the new bow chain, after traveling a 25-in. bite span, is carried inside the bow casting on four ball bearing idlers. As a result of this reduced friction, it travels faster and wears less, according to the manufacturer.

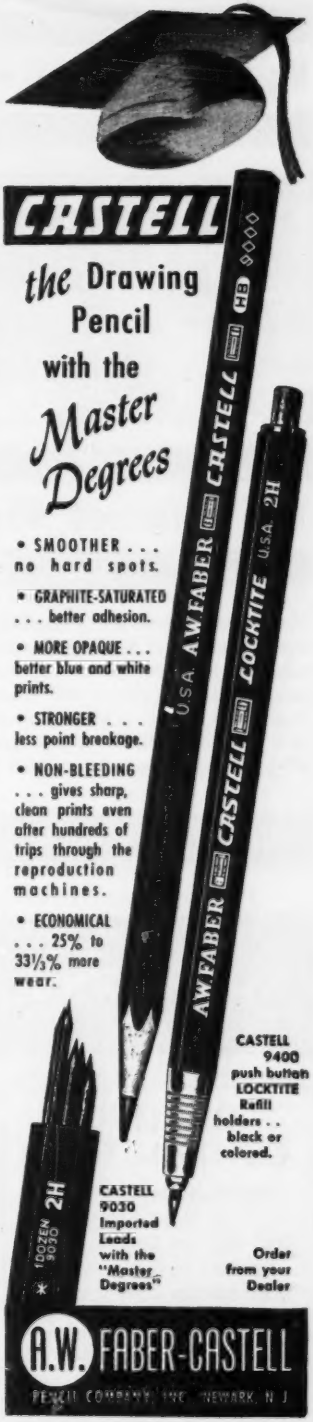
One idler acts as a tensioning point, controlled from a rubber grip handle high on the bow frame. It turns easily to increase or decrease chain tension.

A lower handle—for use in two-man operation—folds compactly against the frame permitting one man to buck logs lying so close to each other that the ordinary saw could not cut one without interference with another.

Instead of running free through the bitespan, the teeth in the new bow saw ride a groove in a two-inch wide guide rail. The log can pinch on this rail but not on the chain travel. Powered by a Mercury gasoline engine, the saw is said to have extra strength and balance because of its angular shape. The free-flow principle permits the chain to be slipped on or off the idlers in a few seconds. HENRY DISSTON & SONS, INC., PHILADELPHIA, PENNSYLVANIA.

("New Products" continued on next page)

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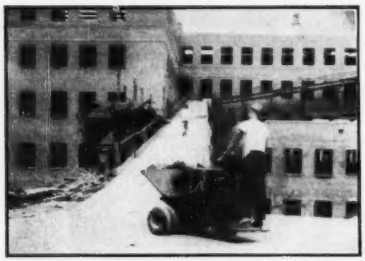

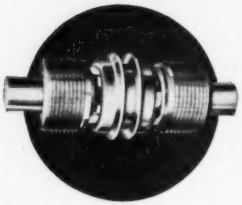

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Concrete Surface Hardener—Tests have proved that the bottom surface in a monolithic concrete slab is generally 25 percent or more harder than the top surface, depending on thickness, richness of mix and the slump. The quality of concrete is not uniform from bottom to top because the heavy abrasion-resistance aggregate sinks to the bottom while laitance is carried to the top. This booklet explains how Plastiment promotes uniformity of quality through the slab by increasing adhesion of the cement-water paste to the aggregate. It also is said to increase top surface hardness over 25 percent and to reduce cracking in the slab as the result of tensile stresses.

Easy-to-understand comparative pictures are included in this 4-p folder which explain how Plastiment retards setting rate of concrete and helps to reduce or eliminate cracking. SIKA CHEMICAL CORPORATION, 35 GREGORY AVENUE, PASSAIC, N. J.

Acusti-Luminus Ceilings—offer glareless, shadowless, even light coupled with efficient acoustical treatment. This 8-p folder shows how hanging tracks support the translucent corrugated UL-approved plastic sheet, mounted on continuous Slimline fluorescent lights. The weight of the entire acusti-luminus ceiling is approximately 1½ lb per sq ft. Its acoustical baffle has a noise reduction coefficient of 0.90, is approximately 1 in. wide and 4 to 6 in. deep—made of 26-gage prime steel.

An interesting 5-picture sequence shows an Underwriters' fire test. In this test an alcohol fire was lit under a steel pan on a floor below a complete acusti-luminus ceiling. The plastic lost its corrugation with 140 deg of heat, softened and fell out. All of the plastic sheeting fell out in 2½ min and the sprinklers above them took the usual 5½ min to pop off at 156 deg F. LUMINOUS CEILINGS, INC., 2500 W. NORTH AVE., CHICAGO 47, ILLINOIS.

Huber Rollers—The Huber rollers are literally taken apart and put together again in this 16-p two-color folder which has chapters on the frame, gear train, guide roll assembly, fluid coupling, clutches, dual control, clean-air cooling and ventilating, and disc-type braking. The inside back cover lists complete specifications for both the 8-12 and the 10-14 ton models.

A cut-away view of the guide roll assembly shows how four heavy struts are welded diagonally from the head at a point near the hub, across the

inside of the roll to the tire at a point near the opposite head. These four struts transfer side thrusts from the tires to the rigid hubs, where they can be absorbed by the axle mounting. Each roll is fabricated by an exclusive Huber process, and the matching rolls are machined in pairs to assure accurate tracking. HUBER MANUFACTURING COMPANY, MARION, OHIO.

Demicon Liquid Floor Hardener—Among the satisfied users of this concrete floor hardener are such important names as the General Motors Corp., Port of New York Authority, Chrysler Motor Car Co., Colgate-Palmolive-Peet, and Ford Motor Co.

Made up in question and answer form, a complete 12-p booklet explains how this entirely-alkaline hardener and sealer is made and applied. DEMAREST ENGINEERING CO., 790 BROAD ST., NEWARK 2, N. J.

"The Story of Homelite"—is the title of a 24-p book which serves as a general catalog of all the company's products. The center spread shows at a glance the complete line of the company's chain saws, gasoline and electric—gasoline-engine-driven electric plants, self-priming centrifugal pumps and gasoline-engine-driven blowers. The booklet is available from HOMELITE CORPORATION, PORT CHESTER, N. Y.

Lubrication Booklet—a comprehensive presentation of the whys and wherefores of lubrication is provided in an attractive, well-illustrated, 26-p booklet by the Service Department of The Euclid Road Machinery Co.

The booklet details procedures for Euclid equipment, but in addition discusses fundamentals of lubrication. Characteristics of lubricants, their properties and tests, reasons for oil and lubricant changes, lubrication intervals and recommended procedures are also included. EUCLID ROAD MACHINERY CO., CLEVELAND 17, OHIO.

Flexible Metal Hose and Tubing—American flexible metal hose and tubing, manufactured by the American Brass Company, is the subject of a 16-p illustrated "quick reference" catalog. The products are made in two basic types: seamless and strip wound. The catalog shows wide range of available alloys and sizes, suggested applications, and data on hose and fittings. Labeled Catalog CC-400, it is available from THE AMERICAN BRASS COMPANY, AMERICAN METAL HOSE BRANCH, WATERBURY 20, CONN.

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EDITORIALS

Developing the St. Lawrence

THERE CAN BE LITTLE DOUBT now that the work of developing the International Rapids section of the St. Lawrence River for navigation and power will get under way in the relatively near future. Most of the major obstacles that for years have stood in the way of that great undertaking have slowly been eliminated. Nevertheless, even the most ardent advocates of the project, if they will stop to consider the subject objectively, must realize that, in the seaway that is to be built under present planning, they will be getting a facility that is outmoded before a shovelful of dirt is moved in its construction.

No serious study of the desirable navigable depth for such a ship canal has been made since before the defunct 1941 agreement was written. Yet at that time some shipping authorities held that the proposed 27-ft depth was inadequate because many ships then under U. S. registry could not navigate through such a waterway under full load. Many more are in that class today.

Because Canada is planning to build the seaway without our help, as it built the Welland Canal between Lake Ontario and Lake Erie, this country is in no position to propose consideration of a canal deeper than the Welland Canal. Nor have people on this side of the border any justification for criticizing the Canadians if they decide to follow the pattern set by the Welland Canal, which now appears probable.

No one in authority on this side of the border has sponsored a statesmanlike approach to the ship-canal project. In both the Roosevelt and Truman administrations, the ship canal was a decidedly secondary issue. Federal development of the St. Lawrence power was the dominant objective. But statesmanship today could still correct this condition—and without any serious delay to the whole undertaking, either for power or navigation.

Planning for the waterway in Canada still is in its early stages. Even the actual location has not been definitely selected, and will not be until much more field work has been done. Consequently, if the incoming Eisenhower Administration should advise the Canadian government that this country would like to reopen the question of participating in construction of the seaway and should propose the immediate appointment of a joint board of engineers to make a new study of what type of waterway should now be built, a full-scale examination of the whole question could be under way within a few months.

Even though such a restudy should delay the actual start of work, the better canal that presumably would result would be well justified. And as shippers in this country will pay a large part of the cost through tolls, regardless of who foots the bill for the initial construction, this country should have a say in what type of canal is to be built.

Opposition to the seaway and power project in Congress has declined progressively in recent years. It should be less in the new Congress. Consequently, the Administration should have no difficulty in getting approval of a new international agreement calling for joint development of the international section of the St. Lawrence River.

Multiple Registration

ONE OF THE ANNOYANCES of engineers who practice in more than one state is the need for being registered in each state where they have any considerable amount of work. And it wasn't long ago that they had to appear personally before some state boards even though their qualifications were beyond question.

Fortunately, that type of narrow provincialism is mostly past history, due in large measure to the work of the National Council of State Boards of Engineering Examiners. The council has worked consistently to eliminate from state laws requirements having little purpose other than to add to the difficulty of obtaining a license, and it has fostered extension of reciprocity among state registration boards.

The council also set up the National Bureau of Engineering Registration as a service agency for engineers needing to be registered in two or more states. That bureau will verify each item in an engineer's professional record, to the extent that verification is practicable, including the fact that he has passed a written examination given by one of the member boards. It will also issue a certificate of qualification if the record meets the basic requirements set by the council.

Due presumably to the lack of publicity given to this registration bureau, relatively few engineers have used it. In the 20 years since the bureau was set up, only 1,400 engineers have applied for certificates of qualification, yet at the present time the number of nonresidents registered by the boards is over 28,000.

What of the future? Can the annoyance of seeking registration in several states and of paying annual fees in those states be eliminated or greatly reduced by some form of national registration? With 48 sovereign states, the answer appears to be no. However, multiple registration can be simplified by development of greater uniformity in state requirements for registration. Much has been done along that line, and more can be. Complete uniformity in basic requirements for training and experience probably never will be attained, due primarily to the different character of the engineering practices in various parts of the country. But all the annoying minor differences ultimately should be eliminated.

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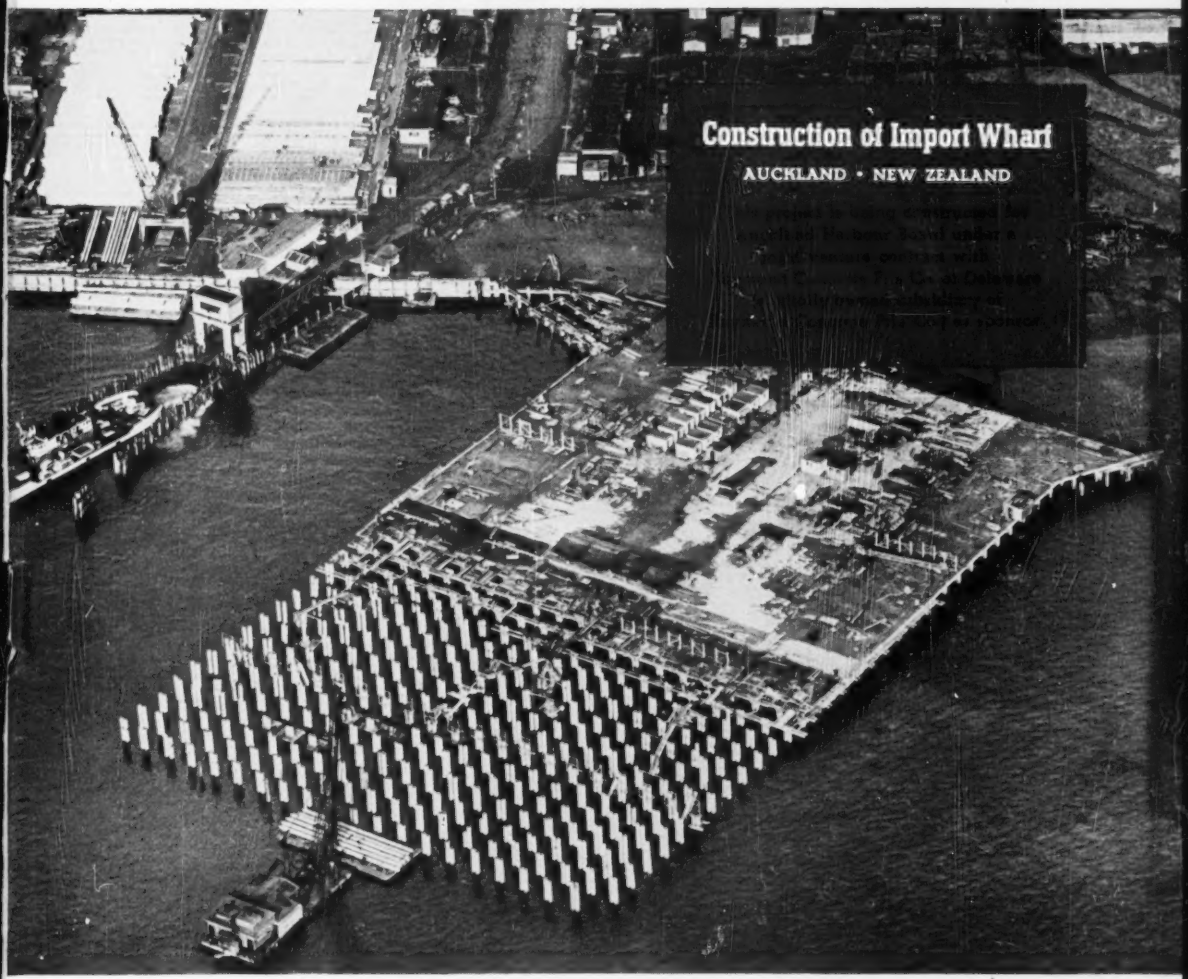

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